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THE LANCET

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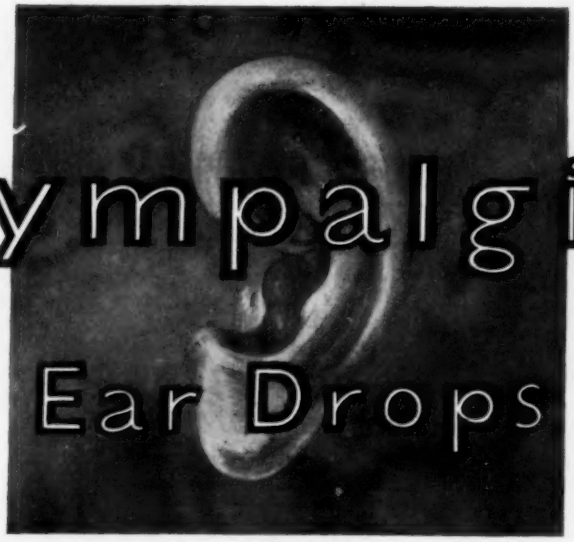

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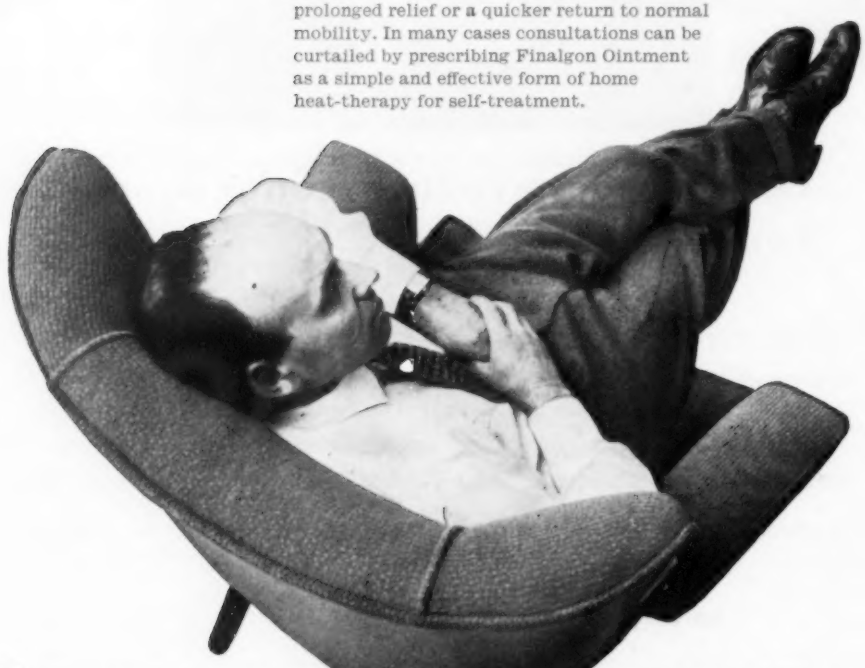

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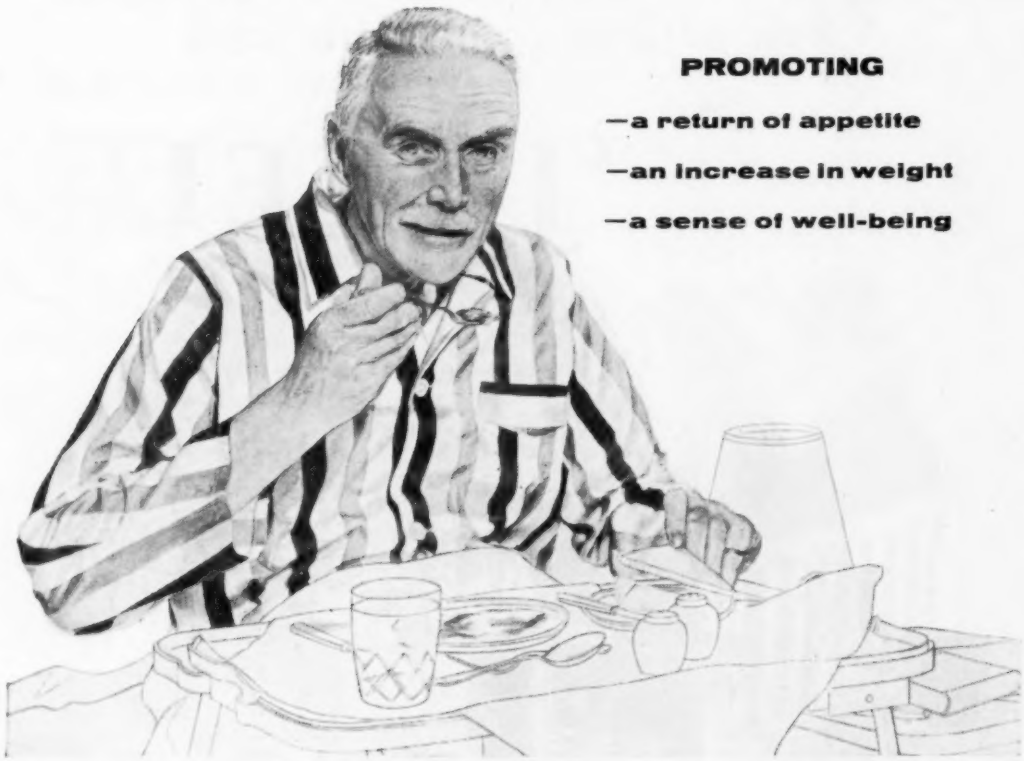

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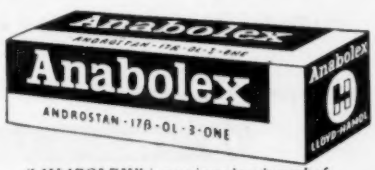

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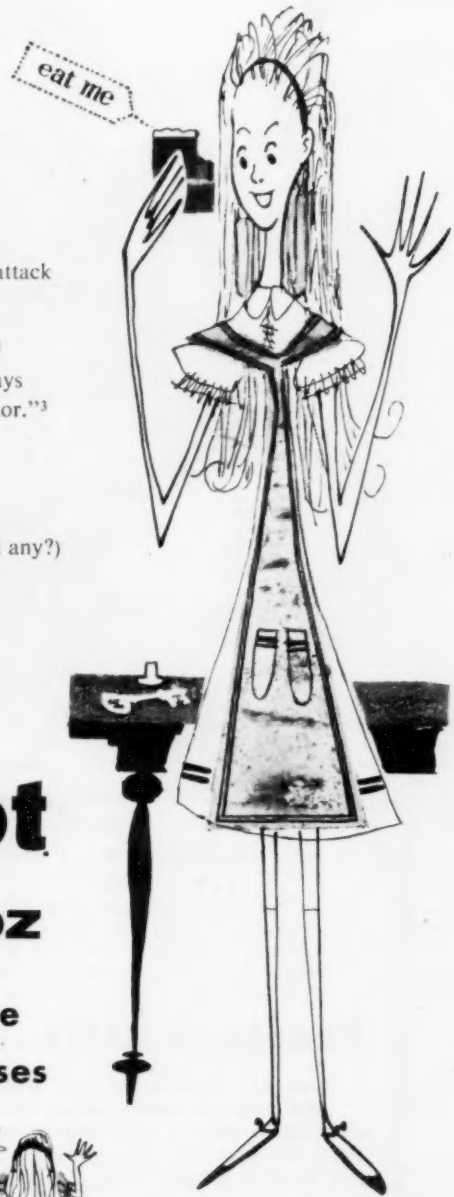
[1] *J. nerv. ment. Dis.* (1952) **116**, 346 [2] *Lancet* (1956) **1**, 794
[3] *Canad. med. Ass. J.* (1955) **73**, 701



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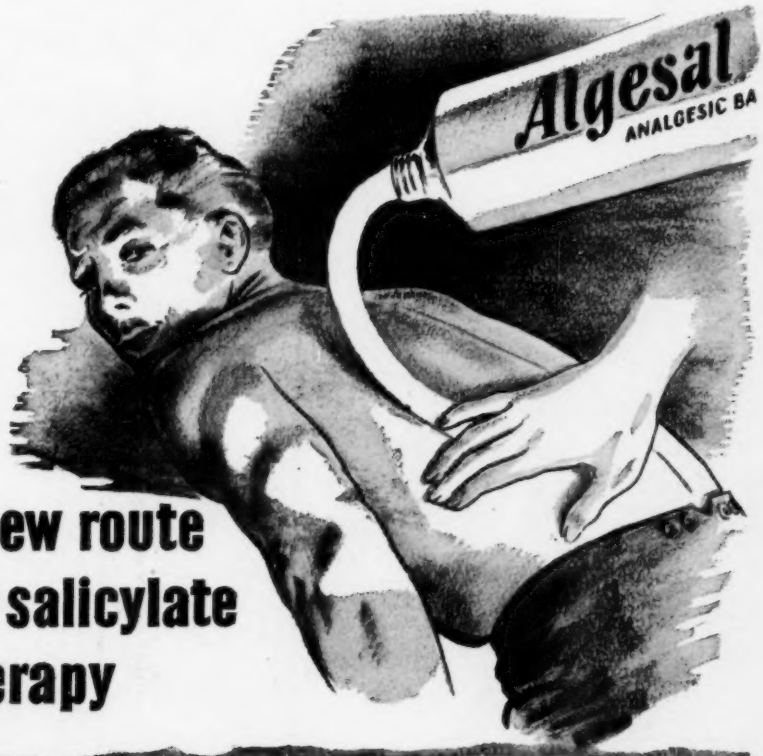

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[1] Practitioner, (1953) 170, 515.

Algesal

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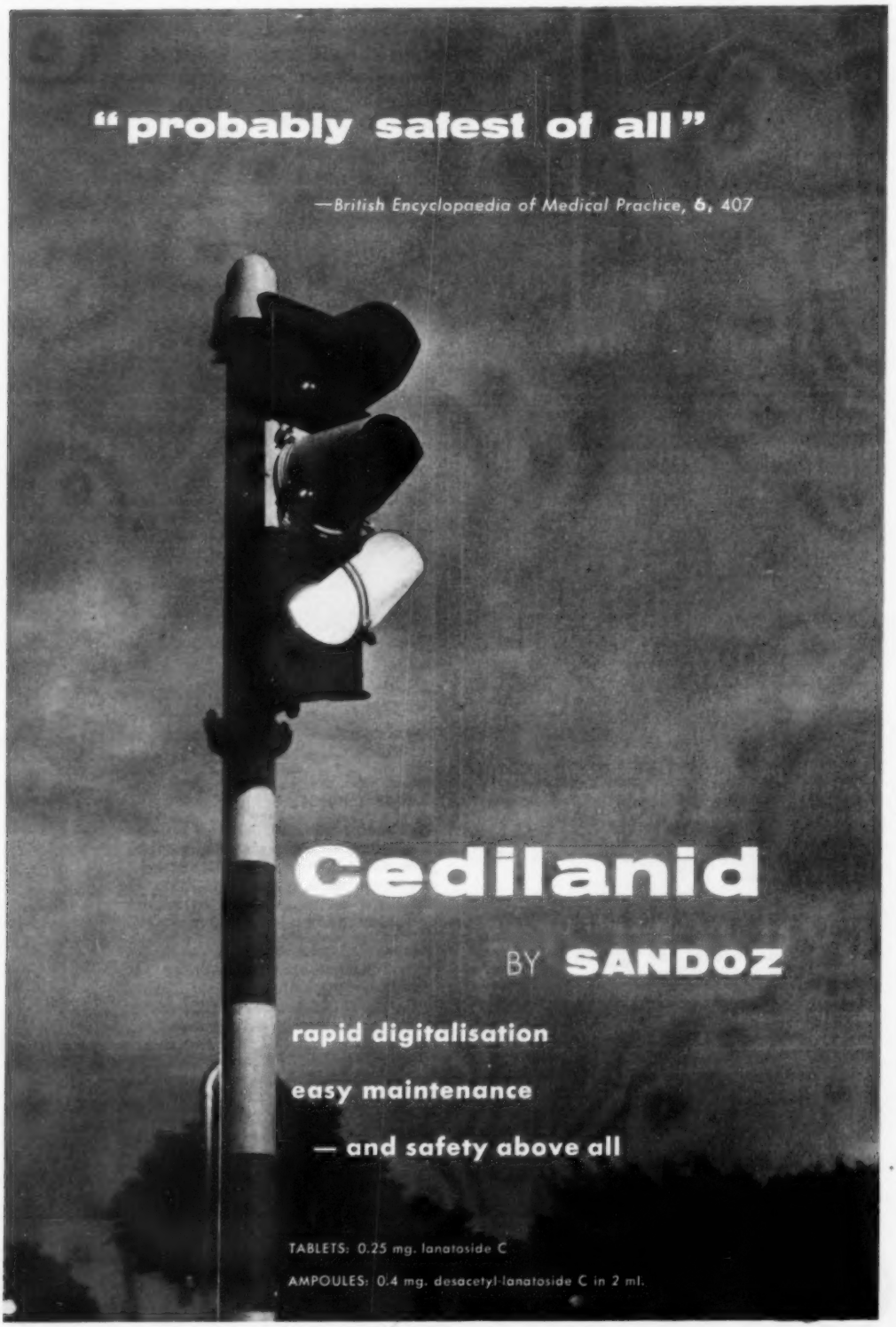
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Antacids. *The Practitioner*, January 1957, **178:** 43

Antacids in Peptic Ulcer. *The Practitioner*, January 1956, **176:** 103

Recent Advances in the Ulcerative Diseases of the Gastrointestinal Tract. *Amer. J. Gastro.*, December 1956, **26:** 665

Ambulatory Continuous Drip Method in the Treatment of Peptic Ulcer. *Amer. J. Dig. Dis.*, March 1955, **22:** 67-71

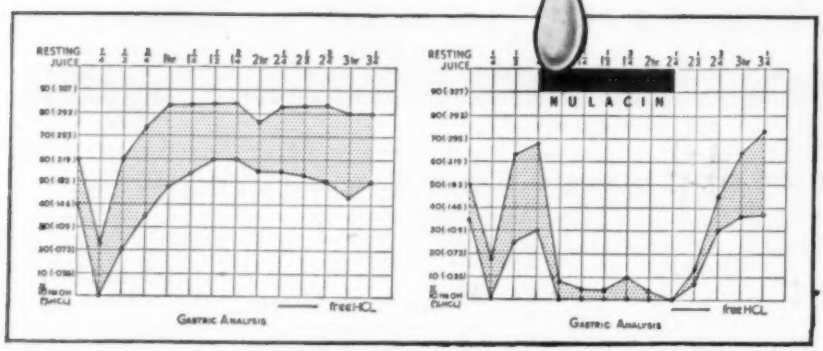
Management of Peptic Ulceration in General Practice. *Med. World*, December 1954, **81:** 591-601

Clinical Investigation into the Action of Antacids. *The Practitioner*, July 1954, **173:** 46

Further Studies on the Reduction of Gastric Acidity. *Brit. Med. J.*, 23rd January 1954, **1:** 183-184

Control of Gastric Acidity by a New Way of Antacid Administration. *J. Lab. & Clin. Med.*, 1953, **42:** 955

The Effect on Gastric Acidity of "Nulacin" Tablets. *Med. J. Aust.*, 28th November 1953, **2:** 823-824



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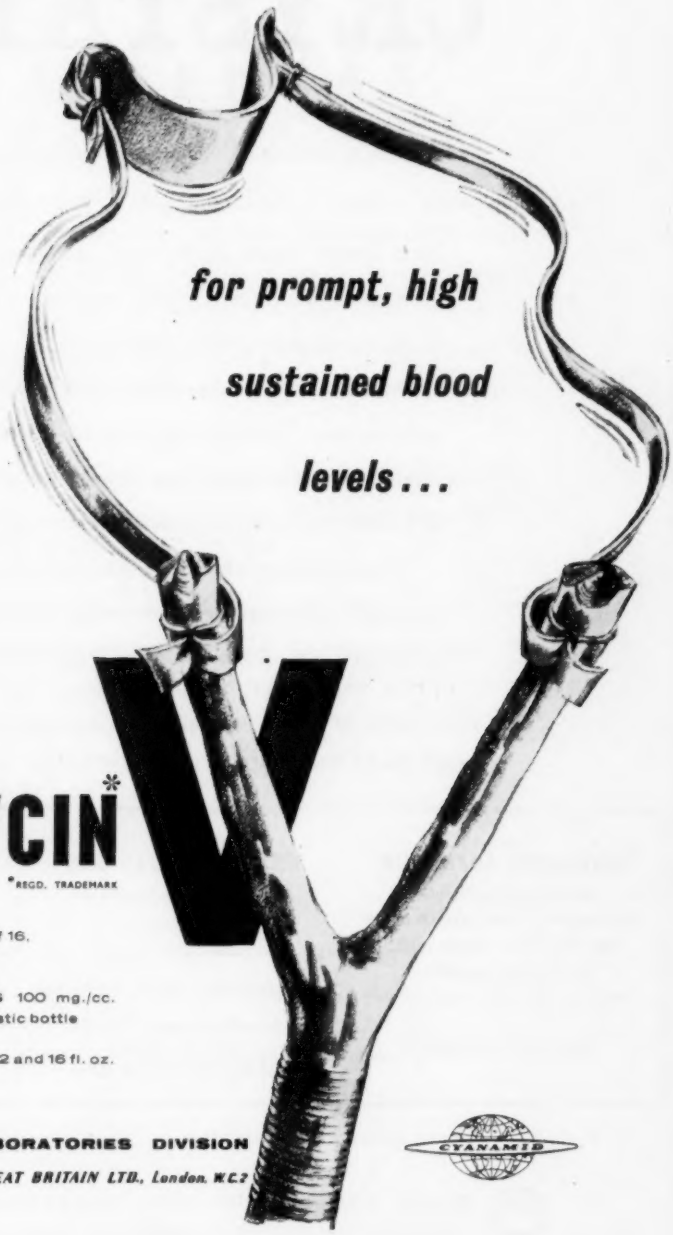

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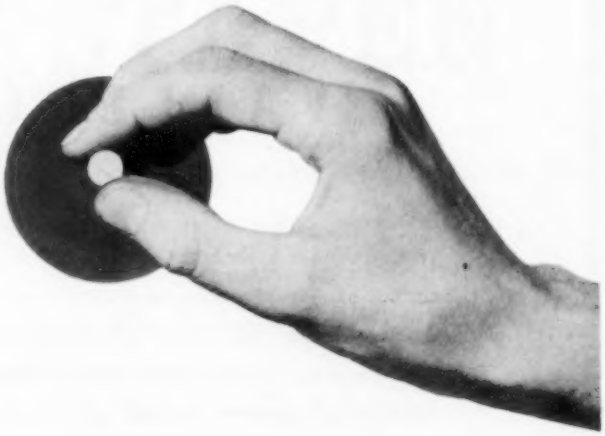

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*Illinois med. J., 1957 *112*, 259.

Each "timed-release" 'TRIOMINIC' Tablet contains:
Phenylpropanolamine-HCl . . . 50 mg.
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Packs: Supplied for dispensing in bottles of 50 and 250

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Also available: 'Triominic' Syrup, for children and those adults who prefer a liquid medication, in bottles of 2 fl. oz. and 20 fl. oz. (dispensing). N.H.S. Basic Price for 2 fl. oz. is 1/10d.

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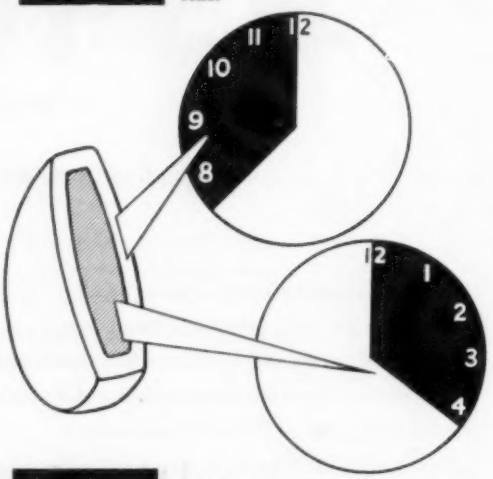

THEN the inner core disintegrates to give 3 to 4 more hours' relief

THUS 3 tablets daily 'unblock around the clock'

STOP *running noses . . .* *and open congested noses orally with 'Triominic'*

Literature and sample on signed request (S4) of physicians only M410

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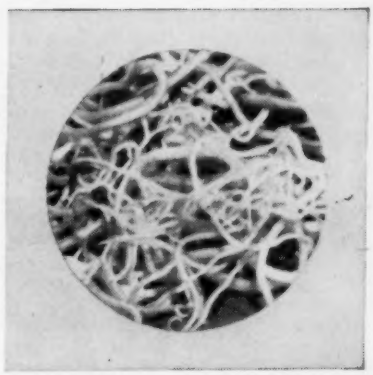

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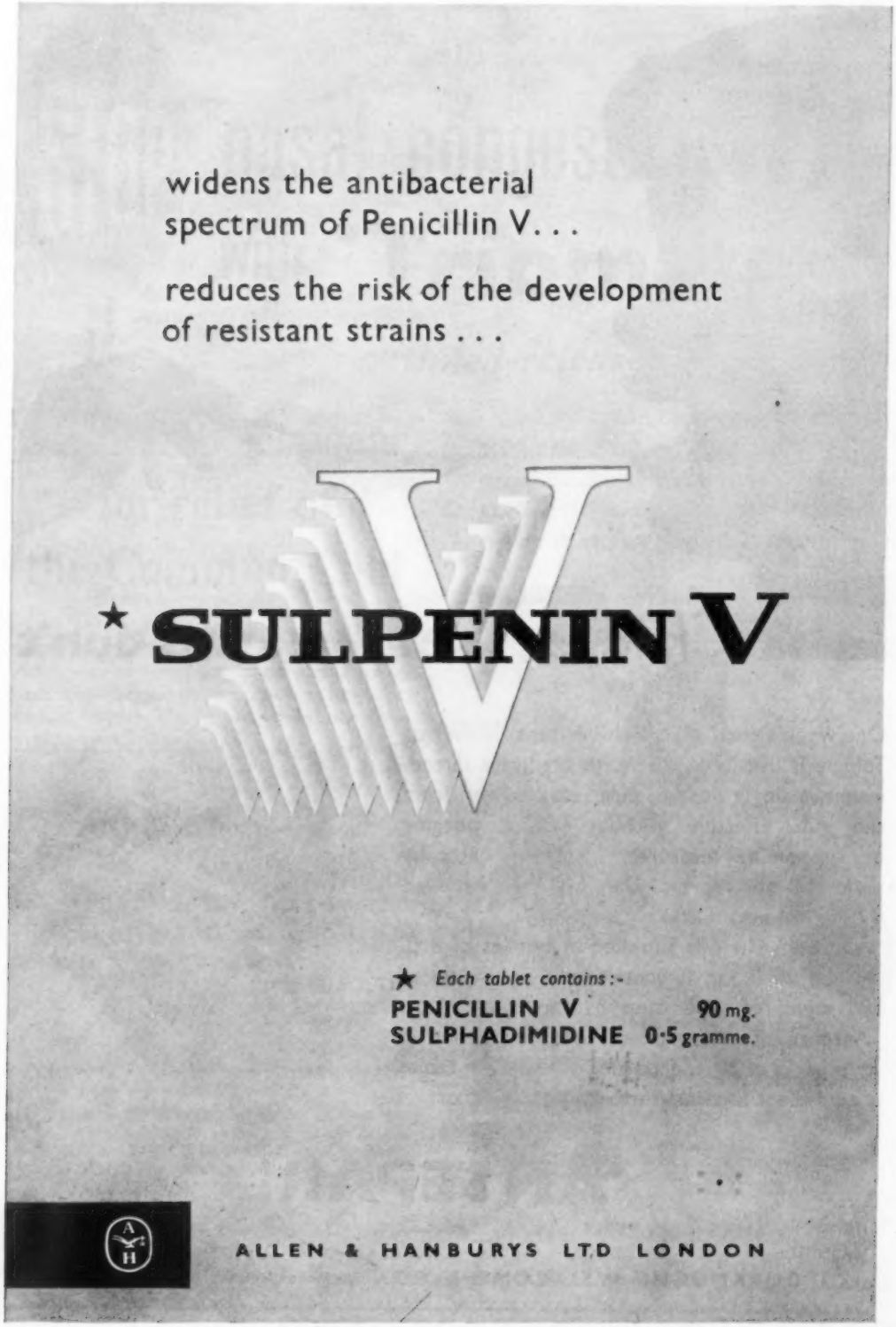
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★ SULPENIN V
★ Each tablet contains:-
PENICILLIN V 90 mg.
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EXCHANGE TRANSFUSION IN NEONATAL HYPERBILIRUBINÆMIA

JOHN O. FORFAR
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CONSULTANT PÆDIATRICIAN, EDINBURGH NORTHERN GROUP OF HOSPITALS; SENIOR LECTURER, DEPARTMENT OF CHILD LIFE AND HEALTH, UNIVERSITY OF EDINBURGH

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R. A. CUMMING
O.B.E., M.B. Aberd.
DIRECTOR,
SOUTH-EAST SCOTLAND REGIONAL BLOOD TRANSFUSION SERVICE

IN icterus gravis neonatorum high serum-bilirubin levels have a well-recognised association with kernicterus, and prophylaxis by exchange transfusion is commonly undertaken. Serum-bilirubin levels of the same order can be found in premature babies without evidence of rhesus or other blood-group incompatibility between fœtus and mother (Crosse et al. 1955, McLean et al. 1955, Brown and Zuelzer 1957), and these babies may likewise develop kernicterus.

The cause of this latter type of hyperbilirubinæmia is not fully understood, though it is generally thought to be related to hepatic immaturity (Billing et al. 1954). Large doses of vitamin K (' Synkavit ') are known to increase hæmolysis in newborn premature infants (Allison 1955, Bound and Telfer 1956, Meyer and Angus 1956), and the incidence of kernicterus was increased in premature infants receiving sulphafurazole (sulfisoxazole *U.S.P.*) (Silverman et al. 1956) though no significant change in serum-bilirubin levels was reported. No satisfactory way of preventing the rise in serum-bilirubin in immature infants has been discovered, and the only treatment in common use has been the removal of circulating serum-bilirubin by exchange transfusion. Recently glucuronic acid (by mouth or intravenously) has been said to lower the concentration of indirect acting bilirubin in the blood (Danoff et al. 1958), but Schmid et al. (1958) think this method may be dangerous.

Most of the published work on exchange transfusion has been concerned with hæmolytic disease of the newborn, where the main object is to reduce the number of circulating Rh-positive cells and to remove antibodies. The technique of such transfusions is based on the supposition that the infant's circulatory system is closed. But whereas Rh-positive cells are confined to the blood-vessels, this is not necessarily true of substances such as bilirubin which can pass between the vascular and extra-vascular spaces. Hence exchange transfusion aimed at reducing hyperbilirubinæmia requires separate study.

Material

During the two years ended in August, 1957, 45 exchange transfusions for hyperbilirubinæmia were performed on 37 infants. Table I shows their sex, birthweight, and gestational age. It includes all transfusions for hyperbilirubinæmia during this period. On only one occasion was a transfusion decided on yet not started. Other infants with hyperbilirubinæmia who were not transfused had been preselected as controls. This preselection depended on sex, weight, and serum-bilirubin level, not on any technical consideration.

In 9 of the transfused infants there was evidence of Rh incompatibility with a positive direct Coombs test: these cases are indicated in the table by a capital letter, together with a number indicating first or second transfusion. We have included only those cases of Rh incompatibility in which the indication for exchange transfusion was a raised serum-bilirubin level. (4 of these 9 cases had had previous exchange transfusions a few hours after birth, but these were primarily for the exchange of red cells.) None of the transfusions to reduce hyperbilirubinæmia was undertaken before the 2nd day of life. One infant was transfused twice for hyperbilirubinæmia. 2 of the 9 infants with Rh incompatibility weighed less than $5^1/_2$ lb. at birth.

The remaining 28 infants have been given a numerical symbol with an additional letter where they had more than one transfusion. All but 2 were below $5^1/_2$ lb. at birth. The direct Coombs test and Wassermann reaction were negative in all. There was no evidence of hæmolysis due to ABO incompatibility: in only 7 of the 28 was the mother group O and the baby group A or B. No infant had received more than a total of 3 mg. of vitamin K and none had been given sulphafurazole.

Thus 26 of the 37 infants had so-called " jaundice of prematurity ". In the 2 who were above the accepted weight limit for prematurity (cases 27 and 28) no cause for the jaundice was found, but presumably the mechanism was the same as in the premature infants.

Meyer (1956) has suggested that 60% of premature infants in whom the serum-bilirubin (estimated by the method of Malloy and Evelyn 1937) exceeds 18 mg. per 100 ml. will show signs of kernicterus. During the two years under review, of 484 infants delivered with a birthweight of $5^1/_2$ lb. or less, 411 survived for over twenty-four hours. Of these, 48 (11·7%) had a maximum serum-bilirubin of 18 mg. or higher, and 33 exchange transfusions were carried out on 26 of them. Second transfusions were required in 6 and a third in 1.

Techniques

Obtaining of Blood Samples

Blood samples—other than those taken during the actual transfusions—were taken from the infant's superior longitudinal sinus via the posterior (or occasionally anterior) fontanelle. At the beginning of a transfusion the serum-bilirubin on the first sample of blood, obtained from a catheter passed through the umbilical vein, was often lower than that on a sample obtained a short time previously from the fontanelle. Perhaps if the end of the catheter comes to lie in the vena cava close to the entrance of the hepatic vein, it will collect blood which has just passed through the liver, and therefore has a lower serum-bilirubin level.

The serum-bilirubin was estimated by the regional blood-transfusion service, normally within one or two hours of collection. Coombs testing, grouping, and cross-matching were carried out on the same sample. Bilirubin was estimated by the method of King and Coxon (1950), which estimates total serum bilirubin. This gives results roughly 10% lower than the Malloy and Evelyn method (Lathe and Ruthven 1958).

Transfused Blood

Donor blood, homologous in the ABO and, where appropriate, Rh systems, was usually less than twenty-four hours old and

never more than forty-eight hours old at the time of use. This obviated the danger from rising potassium levels found in blood stored longer. The packed-cell volume (P.C.V.) of citrated donor blood varies with each bottle but is generally about 40–45%. The P.C.V. of the blood of the infants with a negative Coombs test was generally 10–15% higher than this. At first, unmodified donor blood was used, and its P.C.V. was therefore less than that of the blood of the infant. In later transfusions donor blood was concentrated by the removal of up to 100 ml. of plasma per bottle, which resulted in a P.C.V. of 50–55%.

The blood was warmed slowly to body heat before use.

Prevention of Heat-loss

Exchange transfusions were usually performed in a small room heated to 80–85° F. An electric blanket and radiant heat were also available. The smaller premature infants were transfused in a heated humidified premature nursery.

The baby's temperature was checked frequently by palpation and by rectal thermometer.

Exchange Transfusion Apparatus

Our apparatus was either the special 20 ml. syringe and four-way tap designed by Henderson (1950) or a standard 20 ml. Luer-fitting syringe connected through two two-way taps in series to a catheter manufactured by the Edwards Surgical Company for exchange transfusions (Mollison and Tizard 1957).

In the Henderson apparatus the 'Polythene' cannula (0·5–1·5 mm. bore) leading to the baby is gripped on the outside by a ureteric catheter nipple, thus avoiding any narrowing of the lumen and allowing catheters of various diameters and lengths to be used. The Edwards catheter has a closed blunt end with two side holes and is attached to the distal two-way tap by a fitted sleeve. This catheter, though of relatively large bore, has been used in the umbilical vein of infants as small as 3 lb. (cases 24 and 25). The length of the cannula being fixed by the closed end and by the sleeve at the other end, reduction of "dead space" in the transfusion apparatus by shortening of the catheter, as can be done with an open-ended polyethylene cannula, is not possible. When small volumes only are exchanged at each cycle this may lead to a reduction in the efficiency of the apparatus.

For the premature babies the volume exchanged in each cycle was 10 ml., except in 1 infant in whom 5 ml. cycles were used. In a few of the larger babies, volumes of 15 or 20 ml. were exchanged.

Cannulation of Blood-vessels and Transfusion Technique

The most suitable blood-vessel is the umbilical vein, which can usually be used up to the 7th or 8th day. It is entered at the umbilicus or via a concentric incision just above it. With very small infants an open-ended cannula of greater than 1 mm. bore can seldom be introduced easily, and the length of cannula between the umbilicus and the syringe should be as short as possible so as to reduce the "dead space" and decrease mechanical resistance to the flow of blood.

In 1 infant (case 18) the exchange was carried out through the umbilical artery. It went very smoothly with no upset to the baby.

Exchange transfusion may also be performed by passing a cannula from the bulb of the external saphenous vein into the femoral and iliac veins. This was done in 18 of our transfusions. At first we did not realise that the umbilical vein can be used up to about a week after birth. Because of the

TABLE I—DETAILS OF 45 EXCHANGE TRANSFUSIONS

Case	Sex	Birth-weight (lb. oz.)	Gestational age (weeks)	Day of life	Weight that day (lb. oz.)	Blood-vessel used	Volume exchanged (ml. per lb.)	Duration of transfusion (minutes)	Rate of transfusion (ml. per lb. per min.)	Serum-bilirubin (mg. per 100 ml.)		Circulating mass of bilirubin (mg.)		Calculated minimum mass withdrawn (mg.)	Maximum subsequent level of serum bilirubin	
										Maximum on day of transfusion	At end of transfusion	Before transfusion	Drop during transfusion		Amount (mg. per 100 ml.)	Day
A2	F	7 0	37	2	6 8	R.S.V.	98	115	0·8	26·0	12·0	34·0	18·2	38·0	34·0	3
B2	F	7 6	40	2	7 2	Umb. v.	85	145	0·6	20·0	8·0	28·4	17·0	24·0	17·7	3
C1	F	6 10	41	5	5 13	Umb. v.	89	103	0·9	18·6	11·3	21·6	8·5	29·0	17·6	6
D1	M	8 14	40	4	8 8	Umb. v.	85	91	0·9	19·0	6·6	32·2	21·1	24·0	10·5	5
E2	M	5 10	36	3	5 0	Umb. v.	102	100	1·0	28·5	13·0	28·5	15·5	33·2	23·8	4
F1	F	5 13	?	3	5 4	Umb. v.	104	206	0·5	24·0	15·3	25·0	9·1	39·9	16·4	4
G2	F	4 10	33	5	4 2	Umb. v.	104	167	0·6	..	..	..	..	..	10·3	6
H1	M	6 6	34	4	6 0	R.S.V.	52	65	0·8	21·5	15·2	25·8	7·6	23·6	16·5	5
H2	M	6 6	34	5	6 0	R.S.V.	52	65	0·8	16·5	10·5	19·5	7·2	16·4	..	..
J1	M	5 3	?	4	4 14	R.S.V.	76	145/242	0·5/0·3	21·6	6·0	21·6	13·6	15·2	10·4	5
1	F	3 0	30	7	2 8	L.S.V.	42	30	1·4	23·5	..	11·7	..	..	23·5	9
2	F	3 11	33	6	3 7	L.F.A.	97	33	2·9	23·5	5·3	16·3	12·6	8·9	14·0	8
3	F	4 9	33	6	4 5	L.S.V.	84	72	1·2	23·0	9·5	19·8	11·5	17·1	14·5	8
4	M	4 14½	35	5	4 7	L.S.V.	93	60	1·6	21·0	..	18·5	..	..	15·4	9
5	M	3 15½	31	4	3 8	R.S.V.	67	55	1·2	24·5	..	17·1	..	..	..	..
6a	F	4 15½	32	6	4 9	L.S.V.	93	119/294	0·8/0·3	32·0	12·5	29·4	17·8	26·2	16·0	7
6b	F	4 15½	32	7	4 9	L.S.V.	22	48	0·5	16·0	11·0	14·7	4·6	5·5	9·0	8
7	F	4 7	?	5	3 15	R.S.V.	97	107/327	0·9/0·3	23·5	12·5	18·5	8·7	23·8	16·6	6
8a	F	4 9	33	5	4 1	L.S.V.	98	142/425	0·7/0·2	25·0	..	20·2	..	..	16·0	6
8b	F	4 9	33	6	4 2	L.S.V.	25	31	0·8	16·0	7·8	13·1	6·7	4·0	15·8	8
9	M	4 9	31	6	3 15	L.F.V.	93	97	1·0	27·0	..	21·3	..	..	20·3	9
10	F	3 12½	33	5	3 7	L.S.V.	74	94	0·8	22·8	..	15·5	..	..	13·5	6
11a	F	3 0½	36	5	2 11	L.F.V.	96	64/180	1·5/0·5	32·0	..	17·3	..	..	30·5	6
11b	F	3 0½	36	6	2 12	R.S.V.	112	94	1·2	30·5	9·5	16·8	11·6	14·5	19·8	7
11c	F	3 0½	36	7	2 11	R.S.V.	100	87	1·2	19·8	12·0	10·6	4·2	16·0	25·5	9
12	M	4 3½	33	5	3 13	R.S.V.	93	77	1·2	26·8	12·8	20·4	10·6	22·6	17·8	6
13	M	3 9½	34	8	3 2	R.S.V.	71	43	1·7	23·0	..	14·5	..	..	..	..
14	F	3 13	33	5	3 8	R.S.V.	93	55	1·7	23·0	9·5	16·1	9·4	15·5	14·8	6
15a	F	5 5	36	6	4 12	Umb. v.	55	87	0·6	23·3	16·5	22·1	6·5	21·5	25·9	7
15b	F	5 5	36	7	4 12	Umb. v.	21	58	0·4	25·9	15·3	24·6	10·1	7·6	..	..
16	M	4 4½	30	5	3 8	Umb. v.	86	121	0·7	25·0	13·9	17·5	7·8	20·8	18·0	9
17	F	4 3	32	6	3 8	Umb. v.	102	130	0·8	23·2	12·5	16·2	7·5	22·5	16·7	7
18	F	3 13½	33	6	3 5	Umb. A.	86	107	0·8	28·0	..	18·5	..	..	15·2	7
19a	F	3 10	35	5	3 4	Umb. v.	111	110	1·0	29·6	14·1	19·2	10·1	25·3	26·6	7
19b	F	3 10	35	7	3 3	Umb. v.	84	145/170	0·6/0·5	26·6	13·9	17·0	8·1	18·8	16·5	8
20	M	5 7½	35	6	5 1	Umb. v.	100	115/145	0·9/0·7	26·1	6·9	26·6	19·4	17·4	10·2	8
21	F	3 12½	33	4	3 5	Umb. v.	48	70	0·7	23·4	19·1	15·4	2·8	15·7	21·3	6
22a	F	3 12½	36	4	3 12	Umb. v.	93	68	1·4	26·7	7·6	20·0	14·3	13·3	20·0	5
22b	F	3 12½	36	5	3 12	Umb. v.	73	63	1·2	20·0	8·5	15·0	8·6	11·7	14·3	6
23	M	2 10	28	4	2 8	Umb. v.	116	67	1·7	22·0	10·0	11·0	6·0	14·5	17·3	5
24	M	3 7¾	30	4	3 0	Umb. v.	80	120	0·7	21·5	12·7	12·1	5·2	13·8	20·0	5
25	M	3 9¼	33	5	3 0	Umb. v.	100	152	0·7	27·5	8·1	16·3	11·4	12·2	16·1	7
26	M	3 12	33	4	3 4	Umb. v.	65	87	0·8	21·6	9·6	14·0	7·8	10·1	17·0	6
27	F	7 12	39	4	7 2	Umb. v.	99	120	0·8	24·0	10·0	34·0	20·0	35·0	17·0	5
28	M	6 3¾	41	5	5 8	Umb. v.	104	141	0·7	25·1	11·1	27·7	15·4	32·2	20·5	6

L.S.V. and R.S.V. = left and right saphenous veins. L.F.A. = left femoral artery. L.F.V. = left femoral vein.

manipulations involved, cannulation of the saphenous vein causes more upset than cannulation of the umbilical vein. The incision should be made parallel to the inguinal ligament. In 2 cases, aiming at better exposure, we made the incision in the line of the saphenous vein, and this resulted in a puckered scar.

In the small premature infant the bulb of the long saphenous vein sometimes splits when the cannula is inserted. Hence ligatures must be in place round the femoral vein above and below the junction of the long saphenous vein. If bleeding occurs round the cannula these ligatures will have to be tied, the upper one gripping the cannula. In these circumstances the upper ligature has to be tightened at the end of the transfusion to occlude the femoral vein. This was done on 4 occasions (cases J, 8, 9, 11). In each case moderate œdema of the affected lower limb followed, reaching its maximum in 24 hours and subsiding over the next two to three days. While œdematous the limb became pale and appeared non-jaundiced. When these infants were last seen four to twelve months after transfusion no difference in the limbs could be seen.

In one infant (case 2) transfusion was done through a cannula in the left femoral artery. It went very smoothly and at the end the artery was tied off. Four weeks later the blood-pressure, taken with a 2 in. cuff by the flush method, was 45 mm. of mercury in the right leg and 25 mm. in the left. At 14 months the two limbs were evenly developed and the infant was walking.

Some of the transfusions were intermittent: after the initial transfusion the catheter was left in place and the transfusion was continued in smaller amounts at intervals. The longest duration of such a transfusion was about seven hours. The number of minutes actually occupied in transfusion is shown in table I (cases J1, 6a, 7, 8a, 11a, 19b, and 20), and beneath this the total time from beginning to end of transfusion.

On several occasions a cannula was left in position for much longer periods (up to thirty-six hours); but any transfusion performed more than twelve hours after the preceding one was considered a separate transfusion (and is so recorded in table I) even though the catheter had not been removed. The use of an indwelling cannula was dictated largely by the use of the saphenous vein and the limitations this imposes on repeat transfusions. The cannula was filled with heparinised saline and, between transfusions, it was closed at the syringe end. It was withdrawn when we were sure that further transfusion was not required. No difficulty was encountered with this procedure. As the peak level of serum-bilirubin occurs in most premature infants on the 5th and 6th days of life, the likelihood of further transfusions is greater in infants in whom the first transfusion takes place earlier than this.

Observations

Serum-bilirubin Levels

Serum-bilirubin was estimated in all infants whose jaundice, judged visually, suggested that it might be approaching the critical level of 18 mg. per 100 ml. If this level had not been reached the serum-bilirubin was estimated twice daily, or daily, until exchange transfusion was decided on or until jaundice was obviously fading.

In 10 of the 24 premature infants transfused, the critical level had been reached (sometimes to our surprise) when the serum-bilirubin level was first estimated. In 8 it was reached next day, in 7 two days later, in 1 three days later, and in 2 four days later. With a rapid rise in serum-bilirubin there is a time-lag in skin pigmentation which may lead to a serious underestimate. On the other hand deep jaundice may remain for several days though the serum-bilirubin level is rapidly falling.

In the infants with Rh incompatibility the average age at which exchange transfusion was performed for hyperbilirubinæmia was 3·7 days (range 2–5 days). In the premature infants the corresponding age was 5·5 days (range 4–8).

Serum-bilirubin levels before and after transfusion are shown in table I. In the 35 transfusions in which these are known, the mean difference between them was 14·3 mg. per 100 ml. (25·5 mg. before transfusion; 11·2 mg. after transfusion). The range in individual infants was from 4·3 mg. (23·4 mg. to 19·1 mg.; case 21) to 21 mg. (30·5 mg. to 9·5 mg.; case 11b). The highest percentage drop in serum-bilirubin was 77·5 (23·5 mg. to 5·3 mg.; case 2). The rate of transfusion in this case was the fastest in the whole series. This might suggest that a fast transfusion is an effective one; but we believe that in fact the opposite is true and that by itself a fall in the serum-bilirubin level has only limited significance.

During the twenty-four to forty-eight hours after exchange transfusion the serum-bilirubin nearly always rose above its immediate post-transfusion level (table I). Brown et al. (1957) call this the rebound phenomenon. The probable explanation is that bilirubin passes from the tissues to the blood-stream (Lathe 1955). A fast transfusion lowers the serum-bilirubin level quickly but does not allow time for tissue-bilirubin to escape into the blood. Thus it does not remove as much bilirubin from the body tissues as a slower one, and the rebound is likely to be greater. It was this consideration which led us in several infants to adapt our technique, as mentioned above, so that after an initial exchange of about 55 ml. blood per lb. body-weight the cannula was left in situ and further small transfusions were carried out at intervals of one or two hours.

In 11 infants who were transfused the serum-bilirubin afterwards rose again to a level above 18 mg. per 100 ml. In 2, however, the initial transfusion was considered too small. Further exchange transfusions were carried out in 4 of these (cases 11, 15, 19, 22), one infant requiring two (case 11).

3 infants (cases H, 6, and 8) had repeat transfusions (after an interval exceeding twelve hours) at levels below 18 mg. per 100 ml. In 2 of these (6 and 8) the cannula had been left in the saphenous vein, and a further small exchange before it was removed was thought advisable.

Mass of Bilirubin Removed

In estimating the total mass of bilirubin removed, during 35 transfusions, we have assumed that the concentration of bilirubin in the total volume of blood withdrawn must be at least as high as its concentration in the infant's blood at the end of the transfusion. (From this and the known volume of blood withdrawn—regarding the plasma-volume as 50% of blood-volume—the "estimated minimum mass" withdrawn has been calculated.) This assumption is based on the following evidence:

In 8 transfusions (cases B2, E2, F1, J, 24, 25, 26, 28) the exchange transfusion was arbitrarily divided into sections, each section representing the exchange of approximately 10 ml. blood per lb. body-weight. The serum-bilirubin was estimated at the midpoint of each section. Taking this as the mean bilirubin level of the blood removed in that section, and knowing the volume, the mass of bilirubin removed in the section could be estimated; and finally, for the whole transfusion, the individual masses of bilirubin in each section could be summated.

As a further check, blood removed from the baby (apart from the specimens) was collected in a bottle containing heparin. The volume of blood was measured and a sample taken. The mass of bilirubin present was estimated and to this was added the mass present in the various specimens.

TABLE II—COMPARISON OF DIFFERENT METHODS OF ESTIMATING MASS OF BILIRUBIN REMOVED

Case	Mass of bilirubin removed (mg.)			$^c/_a \times 100$
	(*a*) from serial specimens	(*b*) from waste bottle	(*c*) estimated minimum mass	
B2	41·4	28·8	24·0	58%
E2	47·4	41·6	33·2	69%
F1	50·4	44·2	39·9	79%
J1	19·2	18·2	15·2	79%
24	18·6	14·2	13·8	74%
25	19·3	..	12·2	63%
26	12·4	9·0	10·1	82%
28	48·1	41·1	32·2	67%

The masses of bilirubin removed, as calculated by (*a*) serial serum-bilirubin estimations (*b*) mass in blood withdrawn, and (*c*) estimated minimum mass withdrawn, are compared in table II. In each case as would be expected, the simple method of estimating minimum mass withdrawn gives a figure lower than either of the other two methods of calculation but sufficiently close to it to be of some value. The simple method, however, is obviously subject to individual variation, and in the assessment of our results broad trends and averages are much more important than any individual result. The final column shows the estimated minimum mass removed as a percentage of the mass removed when calculated by serial bilirubin estimation. The mean of the 8 percentages is 71%.

From the appropriate serum-bilirubin levels we have also calculated the circulating bilirubin mass at the beginning and at the end of transfusion assuming the plasma-volume of each infant to be 20 ml. per lb. body-weight on that day (table I). The difference is the drop in mass of circulating bilirubin during the transfusion.

The average minimum mass of bilirubin withdrawn in 35 transfusions was 19·7 mg. The average drop in the circulating mass of bilirubin during these transfusions was 10·8 mg. Thus the mass of bilirubin removed exceeded the fall in circulating mass of bilirubin by 8·9 mg. This difference is likely to represent the amount of bilirubin which had passed from the tissues into the blood-stream during transfusion and had been removed. It represents 45% of the total bilirubin removed. In view of what has been said about minimum mass withdrawn, the true figure is likely to be higher than this—probably in the region of 60%. Indeed in the 8 transfusions in which more accurate methods of estimating the amount of bilirubin withdrawn were employed the difference between the amount of bilirubin withdrawn and the fall in the circulating mass of bilirubin amounted to more than 60% of the mass of bilirubin withdrawn. In these 8 cases the actual mean figure of 62% by the serial-specimen method compared with that of 47% by the estimated minimum mass method. Thus 62% of bilirubin withdrawn probably came from tissues.

Brown et al. (1957) have estimated the amount of bilirubin removed during exchange transfusion and compared this with the theoretical amount which should have been removed on the basis of the number of infant's cells removed. They calculated that 43% of bile removed had come from tissues.

It is very unlikely that hæmolysis of blood during exchange transfusion contributes significantly to the difference between the fall in circulating mass of bilirubin and the actual amount of bilirubin withdrawn.

In 12 of our transfusions, for instance, the packed-cell volume of the infant's blood at the beginning and end of transfusion, and of the donor blood, was known. In these cases the P.C.V. of the infant's blood at the end of transfusion was usually the same as that of the donor blood, whether the P.C.V. of the latter had been above or below the infant's pre-transfusion P.C.V. There was no suggestion that the infant's end-of-transfusion P.C.V. was below that of the donor blood and thus no indication that any hæmolysis had taken place during transfusion.

As it is tissue damage by bile—specifically, brain damage—which we are seeking to avoid, the effectiveness of exchange transfusion cannot be judged by the fall in serum-bilirubin but must take into account the total mass of bilirubin removed from the body. A low end-of-transfusion serum-bilirubin level may result from a too rapid transfusion in which the amount of bilirubin removed is only small. Somewhat paradoxically, a greater amount of bile is likely to have been removed from tissues where the end-of-transfusion level shows only a moderate fall—provided the transfusion has been of reasonable length. Thus, in assessing the effectiveness of an exchange transfusion, estimates of total amount of bilirubin removed are likely to be much more significant than estimates of serum-bilirubin level alone.

Volume of Blood Exchanged

The results given in table III show that with exchange of less than 50 ml. per lb. the yield of bile was poor. There were 4 such exchanges and the average mass of bile removed in these was 8·1 mg. compared with an average of 21·2 mg. for exchanges of over 50 ml. per lb. The average yield of bile in the 7 transfusions of less than 60 ml. per lb. was 13·5 mg. compared with an average of 21·3 mg. in transfusions exceeding this volume. Thus volumes of less than 60 ml. per lb. are unsatisfactory as regards the amount of bile obtained.

In table III the 35 transfusions in which appropriate figures are available are grouped according to their duration. As the period of transfusion in each group remains relatively constant, one can compare the estimated

TABLE III—VOLUME OF BLOOD EXCHANGED AND MASS OF BILIRUBIN REMOVED FOR CONSTANT PERIODS OF TRANSFUSION

Case	Period of transfusion (minutes)	Volume exchanged (ml. per lb.)	Estimated minimum mass bilirubin removed (mg.)	Volume/mass correlation coefficient
8b	31 } <40	25	4·0	+0·769
2	33 }	97	8·9	
15b	58	21	7·6	
6b	48 } 41–60	22	5·5	
14	55	93	15·5	
21	70	48	15·7	−0·221
H1	65	52	23·6	
H2	65	52	16·4	
22b	63	73	11·7	
3	72 } 61–80	84	17·1	
22a	68	93	13·3	
12	77	93	22·6	
23	67	116	14·5	
15a	87	55	21·5	+0·311
26	87	65	10·1	
D1	91	85	24·0	
11c	87 } 81–100	100	16·0	
E2	100	102	33·2	
11b	94	112	14·5	
24	120	80	13·8	+0·614
C1	103	89	29·0	
A 2	115 } 101–120	98	38·0	
27	120	99	35·0	
19a	110	102	33·2	
B2	145	85	24·0	+0·060
16	121	86	20·8	
20	115/145 } 121–150	100	17·3	
25	152	100	12·2	
17	130	102	22·5	
28	141	104	32·2	
J1	145/242	76	15·2	+0·917
19b	145/170	84	18·8	
6a	119/294 } >151	92	26·2	
7	117/327	97	23·8	
F1	206	104	39·9	

TABLE IV—MASS OF BILIRUBIN REMOVED AND EFFICIENCY OF EXCHANGE TRANSFUSION ACCORDING TO VOLUME EXCHANGED

Volume (ml. per lb.)	<60	>60	<70	>70	<80	>80	<90	>90	<100	>100
Average masses of bilirubin removed ..	12·6 mg.	15·0 mg.	11·2 mg.	15·5 mg.	12·0 mg.	20·7 mg.	15·2 mg.	21·3 mg.	20·7 mg.	27·8 mg.
Increase with larger volume	18·6 %		38·4%		72·4%		40·2%		34·3%	

minimum mass of bilirubin removed when different volumes of blood were exchanged.

Though there are exceptions, the tendency (with a constant time of transfusion) is towards increased removal of bile when the volume of blood exchanged increases. The correlation coefficients between volume-of-blood-exchanged and mass-of-bilirubin-removed are shown for the various groups in table III. The mean coefficient calculated proportionately according to the number in the groups is +0·342. This is just over twice the standard error, indicating a significant positive correlation.

Table III permits division within the various groups (i.e., duration of transfusion remaining constant) according to whether the volume of blood exchanged is above or below a certain figure, and calculation within each group of the average mass of bilirubin removed per transfusion above and below that figure. For volumes above and below 60 ml., 70 ml., 80 ml., 90 ml. and 100 ml. per lb., such average masses can be obtained in four or more groups. It is then possible to average these group results and thus to obtain an overall average of mass of bilirubin removed per transfusion for volumes above and below the division points. These overall averages are given in table IV.

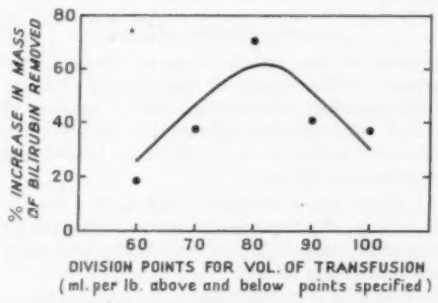

Fig. 1.

From fig. 1, which charts the percentages given in table IV, it is seen that efficiency is highest with an exchange transfusion in the region of 80–90 ml. per lb. Larger volumes will, of course, as shown in table IV, remove more bile but will do so with diminishing efficiency. Brown et al. (1957) concluded that a greater amount of bilirubin was likely to be withdrawn when larger volumes were exchanged. In the 7 transfusions which they reported the average volume of blood transfused was 103 ml. per lb. and the range was 59–156 ml.

Rate of Transfusion

In dealing with small infants, the rate of exchange transfusion is of considerable importance as regards both the safety of the infant and the amount of bilirubin withdrawn. For each transfusion the rate (estimated as volume of blood exchanged per pound of body-weight per minute) is shown in table I. Where the transfusion was interrupted, time and rate are shown both for the period of actual transfusion and for the total time involved. All subsequent calculations are based on this total time.

The average rate in the 45 transfusions was 0·9 ml. per lb. per minute. We found that the infant was more likely to become distressed if the rate exceeded 1·5 ml. per lb. per minute, though in case 2, transfused through the femoral artery, a much higher rate produced only slight distress. Thus for safety the rate should be less than 1·5 ml. per lb. per minute—1 ml. being probably enough. The smaller the infant the greater is the risk that the rate will be too high. The tendency to exceed the limit is less if smaller volumes are exchanged at each cycle, and for most premature babies 10 ml. is a suitable amount. With 5 ml. cycles the relative proportion of "dead space" in the catheter may be large enough to cause a serious reduction in the efficiency of the exchange. Where only small amounts (e.g., 20–30 ml.) are being exchanged, at spaced intervals, it seems less dangerous to proceed more quickly during the periods of intermittent transfusion.

In table V transfusions have been grouped so that within each group the volume exchanged remains approximately constant while the time of transfusion and therefore the rate of transfusion varies. Correlation coefficients between rate of transfusion and mass of bilirubin removed have been calculated as in table III. The average correlation coefficient is −0·435. This is more than $2^1/_2$ times the standard error, indicating significant negative correlation between rate of transfusion and mass of bilirubin removed—i.e., the slower the transfusion the greater the amount of bilirubin removed.

The same procedure, substituting rate for volume, has been applied to table V as was applied to table III. Thus within each

TABLE V—RATE OF TRANSFUSION AND MASS OF BILIRUBIN REMOVED FOR CONSTANT TRANSFUSION VOLUMES

Case	Volume exchanged (ml. per lb.)		Time (minutes)	Rate (ml. per lb. per min.)	Estimated minimum mass of bilirubin removed (mg.)	Rate/mass correlation coefficient
8b	25	20–40	31	0·8	4·0	−0·925
6b	22		48	0·5	5·5	
15b	21		58	0·4	7·6	
H1	52	41–60	65	0·8	23·6	−0·071
H2	52		65	0·8	16·3	
21	48		70	0·7	15·7	
15a	55		87	0·6	21·5	
22b	73	61–80	63	1·2	11·7	−0·707
26	65		85	0·8	10·1	
24	80		120	0·7	13·8	
J1	76		145/242	0·5/0·3	15·2	
3	84	81–90	72	1·2	17·1	−0·071
D1	85		91	0·9	24·0	
C1	89		103	0·9	29·0	
16	86		121	0·7	20·8	
B2	85		145	0·6	24·0	
19b	84		145/170	0·6/0·5	18·8	
2	97	91–100	33	2·9	8·9	−0·286
14	93		59	1·7	15·5	
22a	93		68	1·4	13·3	
12	93		77	1·2	22·6	
11c	100		87	1·2	16·0	
A2	98		115	0·8	38·0	
27	99		120	0·8	35·0	
20	100		115/145	0·9/0·7	17·4	
25	100		149	0·7	12·2	
6a	93		119/294	0·8/0·3	26·2	
7	97		117/327	0·9/0·3	23·8	
23	116	>101	67	1·7	14·5	−0·824
11b	112		94	1·2	14·5	
E2	102		100	1·0	33·2	
19a	111		110	1·0	25·3	
17	102		130	0·8	22·5	
28	104		141	0·7	32·2	
F1	104		206	0·5	39·9	

TABLE VI—MASS OF BILIRUBIN REMOVED AND EFFICIENCY OF EXCHANGE TRANSFUSION ACCORDING TO RATE OF TRANSFUSION

Rate (ml. per lb. per min.)	<0·5	>0·5	<0·7	>0·7	<0·8	>0·8	<0·9	>0·9	<1·0	>1·0	<1·2	>1·2
Average masses of bilirubin removed ..	21·1 mg.	16·5 mg.	19·6 mg.	16·9 mg.	19·5 mg.	16·9 mg.	22·8 mg.	18·1 mg.	23·3 mg.	16·5 mg.	23·1 mg.	14·7 mg.
Decrease with faster rate	27·9%		15·6%		15·0%		26·0%		41·2%		57·7%	

group (i.e., volume remaining constant) the average mass of bilirubin removed per transfusion for rates below and above certain figures has been calculated. It is possible, for rates below and above 0·5 ml., 0·7 ml., 0·8 ml., 0·9 ml., 1·0 ml. and 1·2 ml. per lb. per minute, to obtain such averages from four or more groups. The overall averages are shown in table VI.

From fig. 2, which charts the percentages given in table VI, it is seen that the difference in the amount of bilirubin obtained below and above rates in excess of 0·8 ml. per lb. per minute becomes greater as the rate increases. Thus rates above 0·8 ml. per lb. per minute become progressively less efficient. As already indicated, they are likely also to increase risk. Rates below 0·8 ml. per lb. per minute do not seem to increase the efficiency of the transfusion and mean a much more tedious operation. A rate of 0·8 ml. per lb. per minute thus appears optimal.

Brown et al. (1957) advised that exchange transfusion should be performed slowly but did not indicate what

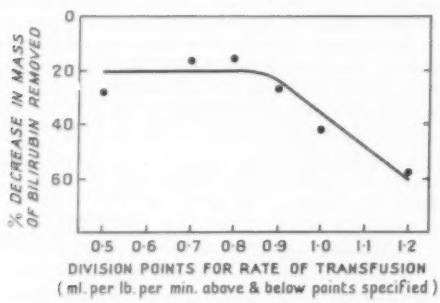
% DECREASE IN MASS OF BILIRUBIN REMOVED
0
20
40
60
0·5 0·6 0·7 0·8 0·9 1·0 1·1 1·2
DIVISION POINTS FOR RATE OF TRANSFUSION
(ml. per lb. per min. above & below points specified)

Fig. 2.

they regard as the optimal rate. From their data it seems that their average rate was 1·4 ml. per lb. per minute with a range of 0·8–1·7 ml. per lb. per minute.

Recommended Rate and Volume of Exchange

Taking into account safety, efficiency, and economy of time it is probably best to aim at a transfusion in the region of 80–90 ml. per lb. body-weight given at a rate of 0·8 ml. per lb. per minute. The duration of such a transfusion would be 100–110 minutes.

We do not feel that prolonged intermittent transfusions of the type referred to above have justified themselves. Only necessity to maintain cannulation of the saphenous vein would now cause us to leave a catheter in position.

Warning Signs

It has always been recognised that sudden death may occur during exchange transfusion, and often no adequate biochemical or pathological cause can be demonstrated. Such disasters may sometimes be averted by paying attention to certain warning signs of distress, the most important of which we have found to be a change in the heart-rate and in the character of the heart sounds. These can be recognised only by very frequent auscultation of the heart and recording of the rate. Should the rate rise above 160 per minute, or the heart sounds become faint, the situation should be assessed immediately. In several cases we have found that the infant's condition was improved by rapid addition or removal of 20–30 ml. of blood. The decision as to which is required is best made by the physician manipulating the syringe, while he listens himself. First extra blood is added. If this makes matters worse, blood should be withdrawn. In most cases it has been found that extra blood has been required, suggesting that the upset was of the nature of oligæmic " shock ".

Post-transfusion Anæmia

In most of the infants anæmia followed exchange transfusion. This would be expected in infants with Rh incompatibility; but in those with " jaundice of prematurity " too the hæmoglobin fell below the levels described by Arthurton et al. (1954) for healthy untransfused premature babies.

The mean pre-transfusion hæmoglobin level in 18 infants with no Rh incompatibility was 15·9 g. per 100 ml., and the mean immediate post-transfusion level in 14 such infants was 14·0 g. (Sahli).

The difference is probably due to the fact that the packed-cell volume of the transfused blood was often lower than that of the baby's blood. Another factor may have been the use of citrated blood. Corridan (1957) states that, owing to the swelling of red cells in acid-citrate-dextrose solution, the hæmatocrit of citrated blood has to be of the order of 60–65% to be equivalent to a " true " hæmatocrit of 50–55%. As the hæmatocrit of our donor blood, even when 100 ml. of plasma had been withdrawn, was 50–55%, the actual hæmoglobin concentration in it is likely to have been less than the hæmoglobin concentration of the infant's blood. A higher degree of concentration of the donor blood than that which we employed might therefore have contributed to the prevention of post-transfusion anæmia.

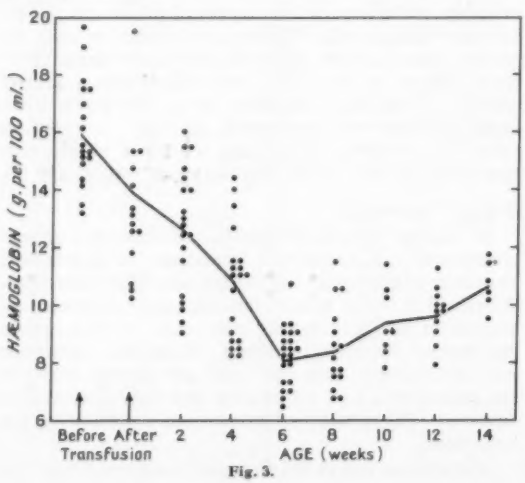

Fig. 3.

Hæmoglobin levels before and after transfusion are shown in the scattergram (fig. 3) in which the mean for each two-week period up to 14 weeks is plotted as a continuous line. It will be seen that the lowest levels were reached at about the 6th week when the mean level in 20 infants was 8·1 g. per 100 ml. This compares with the mean lowest level of approximately 10 g. which Arthurton et al. (1954) (using the Medical Research Council grey-wedge photometer) found in premature infants at the 11th week. One infant (case 24) required a simple transfusion on the 53rd day of life, but the remainder responded satisfactorily to oral iron (ferrous sulphate 60 mg., or ferrous succinate 75 mg., three times daily).

Deaths and Follow-up

2 infants (cases 5 and 13) died during exchange transfusion. Both collapsed and died very suddenly; and, as no abnormality was found post mortem, the cause was presumably some disturbance of biochemistry or circulatory dynamics. In the first case more attention should perhaps have been paid to a heart-rate recorded on three occasions as 200 per minute. The rate of transfusion was 1·2 ml. per lb. per minute and 67 ml. per lb. had been exchanged at the time of death. In the second case the transfusion-rate was probably too fast (1·7 ml. per lb. per minute). 73 ml. per lb. had been exchanged.

One infant (case A_2), with severe icterus gravis neonatorum, died as a third transfusion was being prepared, and another (case 15) whose second transfusion had had to be stopped at 58 ml. per lb. died three weeks later with cardiac failure and was found to have endocardial fibroelastosis. At necropsy none of these 4 infants showed evidence of kernicterus. The only infant in whom exchange transfusion was attempted and failed (when her weight was $1^1/_2$ lb.) died later and had developed kernicterus.

Survivors have been followed up for periods ranging from 24 to 6 months. All are progressing satisfactorily except case 1 whose transfusion was a rapid one and was stopped, owing to the infant's collapse, at the inadequate figure of 42 ml. per lb.

Conclusions

Exchange transfusion appears to be a satisfactory method of removing bilirubin from an infant's circulation. If a volume of 80–90 ml. per lb. body-weight is exchanged, at a rate of 0·8 ml. per lb. per minute, a considerable mass of bilirubin will be removed not only from the blood but also from the infant's tissues. This will reduce the chance of the serum-bilirubin rising to levels at which kernicterus may occur.

The procedure is not without risk, which can be reduced by an understanding of certain hæmodynamic factors. This risk has to be balanced against the danger of brain damage.

The ultimate value of exchange transfusion for hyperbilirubinæmia can best be determined by long-term follow-up of those hyperbilirubinæmic infants given exchange transfusion contrasted with a control series of jaundiced untransfused infants matched for sex, birthweight, and maximum level of serum-bilirubin. Such a study is being made.

Although more physiological methods of treatment may be found, exchange transfusion appears at present to be the only satisfactory means of reducing hyperbilirubinæmia in the newborn infant.

Summary

Details of 45 exchange transfusions for hyperbilirubinæmia, carried out on 37 infants in the first week of life, are presented. In 9 patients rhesus incompatibility was the cause of the high bilirubin level. In the remaining 28, of whom 26 were premature, the Coombs test was negative. No cause other than hepatic immaturity was discovered to account for their jaundice.

Serum-bilirubin was estimated by the method of King and Coxon. Blood samples were taken usually from the superior longitudinal sinus. Fresh compatible blood in acid-citrate-dextrose mixture was used for the transfusion. The umbilical vein was found to be the most suitable vessel and could be used up to 1 week of age. Alternatively the saphenous vein was used.

The mean pre-transfusion level of serum-bilirubin was 25·5 mg. per 100 ml. and the mean post-transfusion level was 11·2 mg. Because of subsequent rise in serum-bilirubin, 7 infants were given further transfusions, 1 requiring three transfusions. A low end-of-transfusion serum-bilirubin is not in itself valid evidence of successful transfusion.

The mass of bilirubin removed from the infant (minimum mass) was calculated in 35 transfusions and found to exceed the fall in circulating serum-bilirubin in 30 transfusions. The mean minimum mass of bilirubin removed was 19·7 mg. per transfusion, whereas the mean fall in circulating bilirubin was 10·8 mg. Thus it appears that at least 45% of the bilirubin removed had come from the infant's tissues.

Both the volume of blood transfused and the rate of transfusion are important. Too small a transfusion is ineffective; too rapid a transfusion is ineffective and also dangerous. Evidence is presented that optimum figures for volume and rate are 80–90 ml. per lb. body-weight and 0·8 ml. per lb. per minute.

Anæmia was the only common post-transfusion complication.

2 premature infants died during exchange transfusion, and 2 others died subsequently (from severe icterus gravis neonatorum and from congenital heart-disease). None showed kernicterus.

We wish to thank Sister M. Moore and Sister C. K. Reid for their valuable help in the nursing of these patients, and Mr. William Grant, F.I.M.L.T., for technical assistance.

We also wish to thank Prof. R. W. B. Ellis for his support.

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HYPERBILIRUBINÆMIA IN PREMATURITY

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KERNICTERUS in premature infants was first reported in 1950 by Aidin, Corner, and Tovey, and by Zuelzer and Mudgett. Since then further reports have appeared (Govan and Scott 1953, Black-Schaeffer et al. 1954, Claireaux et al. 1953, Corner 1955, Crosse et al. 1955, Lelong 1956). It is now a well-established entity.

In infants with hæmolytic disease death from kernicterus occurs before the 4th day of life; but in premature babies death is later—usually between the 5th and 10th days.

The signs of kernicterus are lethargy, disinclination to feed, vomiting, intermittent cyanosis, head-retraction, and increased muscle tone. Later the respirations become shallow and irregular. The child may die 12–48 hours after these signs appear. Many of those who recover have neurological sequelæ such as muscular rigidity, athetosis, and mental retardation.

The serum-bilirubin levels in premature and full-term infants have been studied by a number of workers (Hsia and Allen 1953, Obrinsky et al. 1954, Vine 1954, Billing, Cole, and Lathe 1954, Crosse et. al 1955, Meyer 1956). As a rule the levels were much higher in the premature, being within the range found in erythroblastosis. In full-term infants, though high levels were occasionally found, a figure above 12 mg. per 100 ml. was exceptional.

Investigation

The present investigation of hyperbilirubinæmia was made on a group of infants born in the same maternity hospital. It was prompted by the death of four infants from kernicterus within a few months.

Of these only one was below 2000 g. birth-weight. Three had a gestational age of 31–32 weeks, the fourth being born at 35 weeks. They died on the 6th, 7th, 8th, and 12th days, and in all of them necropsy showed widespread bile-staining of the brain-stem and thalamus. In none had the serum-bilirubin been measured.

After these deaths, serial bilirubin levels were measured in all "premature" infants (i.e., below 2500 g. birth-weight), who developed jaundice, and also in infants of over 2500 g. birth-weight who became deeply jaundiced in the first 3 days of life. Cord-bilirubin levels were not estimated, but the serum-bilirubin was measured from the 2nd or 3rd day.

Capillary blood was used, obtained from a heel puncture made with a thin glass tube. Capillary blood gives a slightly higher figure than venous blood, but venous blood is harder to obtain, since puncture of the femoral vein (the usual method) is easy only in practised hands.

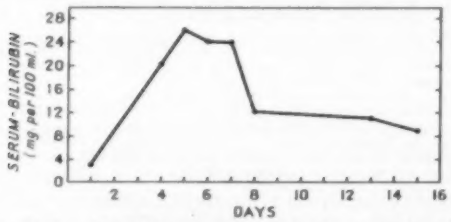

Fig. 1—Birth-weight 2300 g., gestation 36 weeks: Note slow fall in serum-bilirubin.

The total serum-bilirubin was estimated by the van den Bergh method, using a Lovibond colorimeter. The direct or 1-minute bilirubin was estimated in a few cases but was found to be very low (less than 1 mg.) and consequently was not measured as a routine. Hsia and Allen (1953) and Billing et al. (1954) also found low levels of direct bilirubin in premature infants. Rhesus incompatibility was excluded in all cases, and as far as possible ABO incompatibility in most cases.

The series comprises fifty-two "premature" and sixteen "full-term" (infants as judged by their weight). Only five of the latter were actually born at term, the others being of 35–38 weeks' gestation.

In the so-called full-term group the maximal bilirubin levels ranged from 15 to 35 mg. per 100 ml. Ten of the sixteen had levels of 20 mg. or more. Four of these were born at term. One (born at 35 weeks) received an exchange transfusion.

In the premature group the maximal bilirubin levels ranged from 9 mg. to 43 mg. per 100 ml. In twenty-four infants (i.e., nearly half) it was 20 mg. or more. In fifteen it was 25 mg. or more, and eight of these had exchange transfusions. In only three of these fifteen were there any signs of kernicterus. None died (figs. 1 and 2).

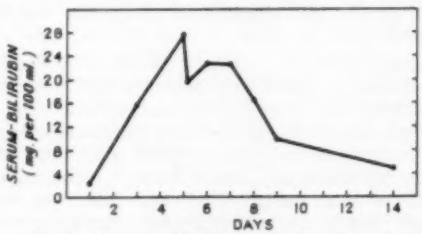

Fig. 2—Birth-weight 2000 g., gestation 35 weeks.

Bilirubin levels were highest on the 4th day in 44% of cases, on the 5th in 19%, and on the 6th in 15%. In a few infants they did not attain their maximum until after the 6th day. Hsia and Allen (1953) found peak bilirubin levels on the 4th day and Vine (1954) on either the 4th or 5th.

In this series we could not show a close correlation between the maximal bilirubin levels and the birth-weight or gestational age. However, of the small group of eight cases with a birth-weight below 1600 g., all but one had a peak bilirubin level over 20 mg. per 100 ml., and four were given exchange transfusions.

Of the ten infants of 32 weeks' gestation or less, all but one had levels of at least 20 mg., and five were given exchange transfusions. Thus the highest bilirubin levels (and therefore the greatest risk of kernicterus) were in babies of 32 weeks' gestation or less and with a birth-weight below 1600 g.

Exchange Transfusions

In view of the likelihood of kernicterus in premature infants, exchange transfusion was performed in eight of our premature group. It was also performed in one baby in the so-called full-term group, who had a birth-weight of 3000 g. but was born at 36 weeks.

In this child the bilirubin rose to 32 mg. on the 6th day, with signs suggestive of kernicterus, and though it was reduced

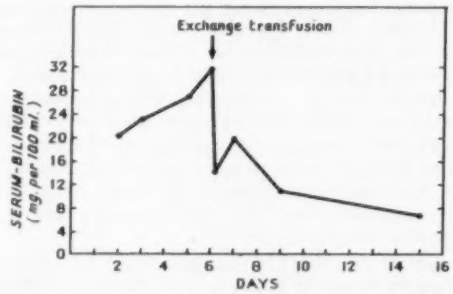

Fig. 3—Birth-weight 2300 g., gestation 35 weeks. One transfusion given.

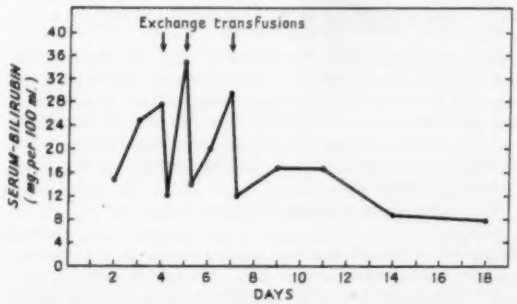

Fig. 4—Birth-weight 1800 g., gestation 32 weeks. This infant required three exchange transfusions.

by exchange transfusion it afterwards rose again to 25 mg., necessitating a second transfusion.

In four of the eight premature babies exchange transfusions were given at levels of 30 mg. per 100 ml. or more (only one had signs of kernicterus), while in the other four the levels were 25, 28, 27, and 20 mg. The child with a level of 25 mg. was clinically normal and transfusion was probably unnecessary. Those with levels of 28 and 27 mg. were lethargic and would not suck. The one transfused when (on the 2nd day) the bilirubin reached 20 mg. was thought to be a case of ABO incompatibility, but this was not confirmed. Two subsequent transfusions were given when the level rose to 30 mg. (figs. 3 and 4).

Four infants had single exchange transfusions, three had two transfusions, and two had three transfusions. Examined at 1–2 years of age, all the nine infants who had exchange transfusions were developing normally and showed no sequelæ of kernicterus. They are still being followed up.

Twenty-five infants whose serum-bilirubin reached 20 mg. per 100 ml., or more, were not transfused because they were clinically normal. None of these has so far developed any sequelæ of kernicterus. These have been followed up from a few months to 2 years of age.

The technique used for exchange transfusion is the same in the prematures as in hæmolytic disease. Even in babies of 6 or 7 days old, no difficulty has been experienced in entering the umbilical vein. Though the vein may not be obvious it can always be found by probing with closed artery forceps. If the umbilicus is unduly protuberant, dissection from the dorsal aspect may be necessary.

The amount of blood transfused was 160 ml. per kg. body-weight. Brown and Zuelzer (1957) attribute the rebound phenomenon (the sudden rise of the serum-bilirubin) after exchange transfusion to a rapid transfer of pigment from the extravascular spaces into the plasma. This transfer goes on while the blood is being removed. They suggest that the bilirubin level is more efficiently lowered if the transfusion is performed slowly and if more blood is used than is needed to exchange the red-cell mass.

Discussion

Hyperbilirubinæmia is probably the most important factor in the production of kernicterus. Kernicterus is never seen in babies with hæmolytic disease who are stillborn or die from hydrops fœtalis in the first few hours of life—because there has been no time for the serum-bilirubin to rise to a high level.

Claireaux et. al (1953) have shown by chromatography that the pigment found in kernicteric brains is indirect bilirubin. Ernster et. al (1957) have demonstrated that concentrations of bilirubin equivalent to serum levels of 40 mg. per 100 ml. interfere with the respiration of various tissues (including brain) in vitro. This work supports the view that accumulation of bilirubin in the brain causes cell damage.

Weech (1947) first suggested that hyperbilirubinæmia is due to immaturity of the liver, which is unable to convert into direct bilirubin the large amounts of indirect bilirubin formed by the accelerated destruction of hæmoglobin during the first week of life.

The more immature the baby, the greater is the immaturity of the liver.

Billing et al. (1954) calculated that the liver of a small newborn infant can excrete bilirubin at only 1–2% of the rate at which a normal adult can do so. Billing and Lathe (1956) demonstrated that excretion of indirect bilirubin involves its conversion into direct-acting water-soluble pigment and that the main pathway is probably through conjugation with glucuronic acid. This has been confirmed by Schmid (1956). Storey and Dutton (1955) have shown that an enzyme system involving uridine diphosphate glucuronic acid is concerned in this conjugation. It has been suggested that the enzyme glucuronyl transferase may be absent, or present in only small quantities, in premature babies (Brown 1957, Billing and Lathe 1958).

Vitamin K has been regarded as a cause of hyperbilirubinæmia in the neonate.

This vitamin has been used for 10 years in the prevention of hæmorrhagic disease of the newborn. Doses of the order of 10 mg. once to three times daily have commonly been given, although as long ago as 1944 Lehmann stated that 0·5 mg. was adequate for prophylaxis against hæmorrhagic disease. Laurence (1955) recorded six cases in which kernicterus developed in prematures shortly after the routine dosage of 'Synkavit' (a water-soluble vitamin K) was raised from a total of 10 mg. to a total of 90 mg. Crosse et al. (1955) noticed a higher incidence of kernicterus in premature infants receiving larger doses of synkavit but also recorded kernicterus in one baby who had had only 2 mg. and another who had had none. Corner in her series of 72 cases (1955) made no mention of vitamin-K dosage and in answer to questions said that the incidence of kernicterus in various premature-baby units under her care bore no relation to the dosage of synkavit.

Meyer (1956) compared the serum-bilirubin levels in two groups of babies: one group received an average dose of 30 mg. of synkavit and the other none at all. The levels in the first group were slightly higher and this was assumed to be significant. A similar experiment was carried out by Bound and Telfer (1956), giving one group 30 mg. of synkavit and the other 1 mg. The mean serum-bilirubin level on the 5th day

was 15·4 mg. per 100 ml. in the first group and 9·7 mg. in the second.

Little experimental work has been done on the possible hæmolytic effect of synkavit. Allison (1955) and Moore and Sharman (1955) found that large doses caused hæmolysis in rats, particularly when their diet was deficient in vitamin E. Against this, it must be pointed out that babies given 90 mg. of synkavit, or more, do not develop anæmia or any other evidence of hæmolysis.

The facts about vitamin K in our series are:

For several years all mothers in the hospital have received 10 mg. of synkavit in the first stage of labour so as to prevent hæmorrhagic disease in the child. Also, premature infants and those born after difficult labour have been given vitamin K routinely. The four babies that died of kernicterus had received 30 mg. of synkavit in the first 3 days of life, for it was then the practice to give 10 mg. daily. Later the dose was reduced from 10 mg. to 5 mg. and then to 1 mg. daily. Of the sixty-eight infants in our present series only four had had more than a total of 10 mg. of synkavit; eleven had 10 mg., twenty 5 mg., and thirty-three only 1 mg. The pattern of hyperbilirubinæmia bore no relation to the dosage of synkavit. Seven exchange transfusions were performed on infants who had received a total of 5 mg. or less.

In our series, therefore, vitamin K does not seem to have played much part in the development of hyperbilirubinæmia, though in the fatal cases of kernicterus it may have been contributory.

In hæmolytic disease a definite correlation between serum-bilirubin levels and the incidence of kernicterus has been demonstrated (Mollison and Cutbush 1954, Hsia et al. 1952):

Mollison and Cutbush (1954)			Hsia et al. (1952)		
Maximum bilirubin (mg. per 100 ml.)	No. of cases	No. of cases with kernicterus	Maximum bilirubin (mg. per 100 ml.)	No. of cases	No. of cases with kernicterus
30–40	11	8 (73%)	31	12	6 (50%)
25–29	12	4 (33%)	16–30	50	9 (18%)
19–24	13	1 (8%)	6–15	91	3 (3%)
10–18	24	0	0·5	76	0

These figures suggest that kernicterus is likely with serum-bilirubin levels over 30 mg. per 100 ml. and unlikely when the level remains below 20 mg. Some infants with levels as high as 40 mg. per 100 ml. have escaped whereas others with levels as low as 25 mg., or even lower, have developed kernicterus. Indeed, some other workers have seen kernicterus in premature infants with maximal bilirubin levels below 20 mg. (Crosse et al. 1955, Harris et al. 1958).

Though all these figures relate to hæmolytic disease, they probably hold good equally for other types of neonatal jaundice in which levels of indirect bilirubin are high.

Exchange transfusion has greatly reduced the incidence of kernicterus in infants with hæmolytic disease (Mollison and Walker 1952), and there is no reason why it should not do the same in premature infants with hyperbilirubinæmia.

The risk of kernicterus is undoubtedly high when bilirubin levels rise above 30 mg. per 100 ml. and almost negligible when they are below 18–20 mg. Given that exchange transfusions are necessary in some premature infants to prevent kernicterus, the question is when to give one.

Brown and Zuelzer (1957) performed exchange transfusions on fifteen premature and six full-term infants who had bilirubin levels over 20 mg. per 100 ml. Before transfusion all these infants appeared normal, and Brown and Zuelzer wondered whether some of the transfusions were unnecessary. Crosse (1957) chose 18 mg. as the level for exchange transfusion. Dundon's (1956) series consisted of twenty-two infants with bilirubin levels over 20 mg. of whom twelve were given exchange transfusions. He regarded 30 mg. as a critical level but thought that transfusion was sometimes required in infants with lower levels—especially where the serum-bilirubin had risen rapidly after the 3rd day.

At present one cannot be dogmatic as to when exchange transfusions should be given, and the practice in different pædiatric units differs widely. Transfusion performed as a routine whenever the serum-bilirubin reaches 20 mg. per 100 ml. would seem to be unnecessary.

Our own present practice is to transfuse all infants whose serum-bilirubin reaches a level of 30 mg. Those with a serum-bilirubin below 30 mg. are transfused only if they become lethargic, irritable, or difficult to feed, or if there is a rapid rise of serum-bilirubin on the 3rd or 4th day. This policy, of course, necessitates close watch on the infant, with 12-hourly bilirubin estimations. A second or third transfusion is given if the bilirubin rises to 25 mg. within 24 hours of the first transfusion. If exchange transfusions are performed at these bilirubin levels, kernicterus should usually be prevented.

Summary

A study was made of the serum-bilirubin levels of sixty-eight neonates, all but five of whom were born before term.

In thirty-four the serum-bilirubin rose to 20 mg. per 100 ml. or above that level. Nine infants had one or more exchange transfusions. There were no cases of kernicterus.

The indications for exchange transfusion are discussed.

We wish to thank the pathological department of Barnet General Hospital for the serum-bilirubin estimations and the department of medical photography at The Hospital for Sick Children, Great Ormond Street, for designing the charts.

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BACTERIOLOGY AND HISTOPATHOLOGY OF THE RESPIRATORY TRACT AND LUNGS IN FATAL ASIAN INFLUENZA *

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AFTER a strain of Asian-influenza virus had been received from Dr. C. H. Andrewes at the end of May, 1957, we confirmed the observation of Isaacs (A. Isaacs personal communication) that human-egg-lines were non-sensitive to the so-called Chu- or beta-inhibitor of normal animal and human sera (Chu 1951).

Since only mouse-lung-adapted derivatives from all former human A-strains are non-sensitive to beta-inhibition (Brans et al. 1953, Briody et al. 1955), it seemed possible that the Asian virus could be primarily pathogenic for human lung tissue; and in order to find out whether fatal virus pneumonia might occur in Asian influenza, Dutch pathologists throughout the country were asked to collaborate in this investigation (Hers et al. 1957).

Results

Of 148 virologically confirmed fatal cases of Asian influenza a strain of Asian virus was isolated in the chick-embryo from lung tissue in 106 and from the trachea in 15, the lung from these latter cases yielding no virus. In 20 cases ferrets, inoculated intranasally with lung tissue, developed a positive hæmagglutination-inhibiting (H.I.) titre to the Asian virus. In 7 patients who died late in the disease the heart-blood contained complement-fixing antibody (using soluble antigen A) and H.I. antibody to the Asian virus. In another 63 cases the histopathology of the epithelium of the respiratory tract was typical of influenza (Straub 1937, Hers 1954); but no influenza-virus infection could be demonstrated, partly because no blood-serum from late stages was available. These cases are not considered in this paper. In all, in 70% of the necropsies which were considered to be cases of fatal influenza, influenza-virus infection could be shown to exist.

Bacterial Findings in Lung

These findings are shown in table I. In this table 10 cases are added from which influenza virus and *Staphylococcus aureus* (in 7 cases) were isolated post mortem by needle aspiration from the lung, no necropsy being performed afterwards. All strains of *Staph. aureus* were coagulase-positive.

Histopathological Diagnosis of Influenza-virus Pneumonia

Even when influenza virus is isolated from the lung " tissue " in high concentration, this does not necessarily mean that the lung will also show lesions attributable to " pneumotropism " of the virus. In lungs from 17 necropsies of fatal cases of influenza-A during the period 1941–53 we were never able to convince ourselves that pneumonic changes due to virus infection were present, although in 13 cases, in which the patient had died in the acute stage of the disease, a strain of influenza-virus could be isolated from the lung " tissue ". It is not known where the virus is situated in these 13 cases, but most of it may have been aspirated into the respiratory bronchioli, alveolar ducts, and alveoli antemortem.

Since histopathology of experimental œdematous hæmorrhagic influenza virus pneumonia in ferrets and mice so far has not been investigated carefully enough, comparison with lung lesions in fatal human cases is not yet possible.

TABLE I—BACTERIOLOGICAL FINDINGS IN LUNGS FROM 158 CONFIRMED FATAL CASES (84 MALE, 74 FEMALE) OF ASIAN INFLUENZA IN PATIENTS AGED 0–90 YEARS IN THE NETHERLANDS (JULY, 1957, TO MARCH, 1958)

*Staph. aureus**	β-hæmolytic streptococcus (group A)	Pneumococcus †	*Hæmophilus influenzæ* ‡	*Escherichia coli* §	No flora
102	1	4	4	17	30

* Plus pneumococcus type 19 in 1 case, *Hæmophilus influenzæ* in 1 case, *Pseudomonas pyocyanea* in 1 case, proteus in 3 cases, pneumococcus type 17 in 1 case, group-B hæmolytic streptococcus in 1 case.
† Type 23 in 2 cases, type 9 in 1 case, type 15 plus group-B hæmolytic streptococcus in 1 case.
‡ Plus pneumococcus type 10 in 1 case, pneumococcus type 6 in 1 case, pneumococcus type 19 in 1 case.
§ Plus proteus in 1 case.

Comparing earlier work (Winternitz et al. 1920, MacCallum 1921) with our own observations on Asian influenza, we can assume with reasonable certainty that influenza-virus pneumonia is characterised by the following criteria: (1) cytopathogenic changes in the respiratory epithelium extending down to the respiratory bronchioli and alveolar ducts (Hers 1954, Straub 1958); (2) cytopathogenic changes in the fixed alveolar cells (probably also seen by MacCallum [1921] in cases of 1918-influenza); (3) capillary thrombosis and necrosis with focal leucocytic exudate, (which can be clearly demonstrated by staining with hæmatoxylin-tartrazine-phloxin by Lendrum's method; (4) capillary aneurysms and capillary hæmor-

TABLE II—HISTOPATHOLOGICAL AND BACTERIOLOGICAL FINDINGS IN LUNGS FROM CONFIRMED FATAL CASES OF ASIAN INFLUENZA IN THE NETHERLANDS (JULY, 1957, TO MARCH, 1958)

Age (yr.)	No.	Sex		Bacterial pneumonia			*H. influenzæ* bronchiolitis	Influenza-virus pneumonia	Influenza-virus bronchitis
		M	F	*Staph. aureus*	β-hæmolytic streptococcal (group A)	Pneumococcal			
0– 5	15	10	5	8*†		5†		1	1
6–10	17	9	8	16		1			
11–20	20	9	11	20*					
21–30	18	7	11	12				6	
31–40	17	7	10	8	1	2†		6	
41–50	6	3	3	2				4	
51–60	19	10	9	8**		5		5	1
61–70	26	17	9	11**		8		5	2
71–80	9	7	2	2		2†	1	3	1
81–90	1	1							1
Total	148	80	68	87‡ *59%*	1	23§ *15%*	1	30 *20%*	6

* Case probably associated with pneumococcal pneumonia.
† Case associated with *H. influenzæ* bronchitis.
‡ In 85 cases confirmed bacteriologically.
§ In 4 cases confirmed bacteriologically, and in 19 cases tentatively diagnosed on the appearance of the pneumonic exudate, cultures from these cases remaining negative or showing *Esch. coli*.

* Paper presented at a meeting of the Pathological Society of Great Britain and Ireland, Newcastle upon Tyne, July 3, 1958.

rhage; (5) appearance of plasmatic exudate after 3–4 days, lining the alveolar ducts and alveoli and showing a positive periodic-acid Schiff reaction (so-called hyaline membranes of 1918 influenzal pneumonia); (6) regeneration of the epithelium of the respiratory bronchioli and alveolar ducts after 5–7 days into a stratified pseudo-metaplastic layer, sometimes giving the impression of neoplastic growth; (7) regeneration of alveolar epithelium into a continuous monolayer of epithelial cells covering the alveolar wall. In our material pure virus pneumonia was in no case a diffuse process but was focally distributed in both lungs. Sometimes the foci were clearly lobular.

Histopathological Lesions in Asian Influenza

Table II and the accompanying figure show the age-distribution and the types of the histopathological lesion (1–5) found in 148 confirmed cases. It is seen from the figure that in 20% of all cases pure virus pneumonia (type 2) and in 31% a combination of bacterial and virus pneumonia (type 5) were considered to be present. The classification of type 4 and 5 remains in many cases arbitrary because of severe coexistent necrotic purulent destruction of the lung tissue. Very probably the relatively high incidence of pure virus pneumonia is also due to early antibiotic treatment. Tables I and II together show that postmortem bacteriological diagnosis of pneumonia in this antibiotic era needs histopathological and virological control.

In the accompanying figure each type of lesion has been correlated with the patient's clinical history and other coexistent postmortem findings. Chronic heart- and lung-disease rank first in number of pre-existent diseases predisposing towards fatal influenza (see also Giles and Shuttleworth 1957). The frequent coincidence of fatal influenza-virus pneumonia and mitral stenosis (4 of these patients were pregnant) and myofibrosis (coronary-artery disease) is very important.

Most probably in most of these cases more or less chronic congestion of the lungs was present, but the explanation of this coexistence is not clear. We considered the possibility of an augmented number of alveolar cells—a state often present in chronic congestion of the lungs—favouring perhaps the propagation of the influenza virus. Many previous healthy people have contracted fatal pneumonia of type 5. The possibility exists that in many of these cases secondary bacterial infection may have promoted pneumotropism of the influenza virus, but the reverse may have occurred also. Table II and the accompanying figure are not representative of causes of death from influenza in the Netherlands, because necropsies were performed mostly on the younger age-groups, who were admitted to hospital more frequently than older patients.

Discussion

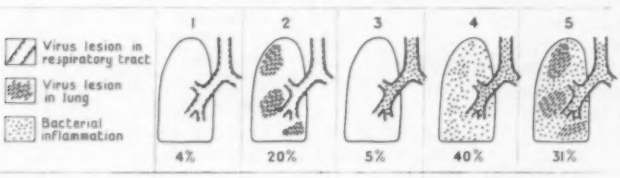
The histopathological picture of 1957 Asian influenza in many cases is very suggestive of pure influenza-virus pneumonia, and resembles that of 1918 influenzal pneumonia. From this we may assume that the 1918 influenza virus was also pneumotropic in man.

The first question to be answered is, whether this "pandemic" pneumotropism is exceptional in human influenza, or whether it has been present in every seasonal wave of this disease—in some of which the total mortality was substantially higher than in Asian influenza. Unfortunately this question cannot be answered with any certainty. We found 1 case described in the literature in 1933–56 in which very probably foci of viral lung lesions were present (Parker et al. 1946: a case from the epidemic of influenza-A in 1943). We can only tentatively say that we have the impression that the peculiar pathology of Asian influenza was not clearly encountered in former years in the Netherlands. Nor have we seen a clinical picture suggesting influenza-virus pneumonia in the period 1937–56. Therefore the possibility exists that the influenza-virus-A strains in the period 1933–56 had hardly any pneumotropic "virulence" for the human lung.

Virology of the 1957 Asian strain is not much help in solving the problem. The peculiarity of the Asian virus in being non-sensitive to beta-inhibition can explain its human pneumotropism; but nearly all former human influenza-A strains could be easily adapted to the mouse-lung, so it can be assumed that those strains contain beta-inhibitor non-sensitive mutants which are selected during passages in mice. We could easily isolate Asian strains by passing sputum or emulsified lung-tissue directly in mice; but Francis et al. (1937) found the same in A-strains prevalent in the 1937 epidemic (A-PR$_8$-type strain). Moreover the potential pneumotropism of Asian strains for mice is not exceptionally high. Strains passed directly from human lung tissue to mice did not cause fatal virus pneumonia before the 4th passage.

Since general mortality from Asian influenza in its "first" wave has been low, we can conclude that, although the Asian virus has clearly shown a potential pneumotropism for human lung-tissue, its human pneumotropic "virulence" has so far been low and often has been propagated in some way by pre-existing congestion of the lungs (associated with heart-disease), other lung disease, pregnancy, and perhaps also coexistent secondary bacterial infection.

From what we know of the mortality and the pathology of 1918 influenza, which most probably was caused by



	1	2	3	4	5
Pre-existing disease:					
Kyphoscoliosis	..	1	..	1	..
Tuberculosis	1	1*	2	..	1
Emphysema and chronic bronchitis	1	2	1	8	2
Anthracosilicosis	..	1	..	3	1
Mitral stenosis	..	10†	..	1	..
Aortic "	2	1	..	..	..
Myocardial fibrosis	..	5	..	5	2
Other heart-disease	..	1	..	..	1
Multiple sclerosis	..	..	..	1	..
Epilepsy	..	..	..	1	1
Idiocy	..	..	..	4	1
Other neurological disease	..	..	1	1	..
Other disease	1	2	..	3	6
Pregnancy	..	1	..	..	1
Previously healthy	1	5	3	31	30

*Associated with pregnancy. †4 cases associated with pregnancy.

Types of histopathological lesions in 148 virologically confirmed cases of Asian influenza.

the A-swine type of strain (see Shope 1958), we may presume that in the second wave of this pandemic the high mortality was caused by a strain which had developed within a few months a high human pneumotropic virulence. In this respect it is important to notice that we found that two swine-egg-lines of the Shope virus were also non-sensitive to beta-inhibition (Mulder and Masurel 1958b), and that the potential pneumotropism and virulence for mice and ferrets of pure swine-lines of this virus are extremely high, the animals dying from fatal virus pneumonia in the 1st or 2nd passage (see also Shope 1935). This in turn points to the possibility that the 1957 pandemic virus and perhaps also that of 1918 influenza may have originated from an animal carrier (swine ?) in which the strain developed non-sensitivity to beta-inhibition associated with a potential pneumotropic affinity.

Neither the 1889 nor the 1957 pandemic, which may be virologically related (which again points to a possible animal reservoir in Asia (Mulder and Masurel 1958a), were soon followed by a severe pneumotropic wave. Careful studies during a possible second wave of Asian influenza which can be expected in the near future will perhaps shed light on this difference from 1918 influenza. Meanwhile it would be wise to consider the possibility that the potential human pneumotropism of the Asian virus will be still present then and may even be enhanced.

Summary

148 virologically confirmed fatal cases of Asian influenza in the Netherlands were analysed bacteriologically and microscopically.

Staphylococcus aureus was the most common secondary invader in these cases (in about 60%).

In 20% pure influenza-virus pneumonia was considered to be the cause of death.

The histopathology of this pneumonia resembles closely that of fatal 1918 influenza. Cytopathogenic changes in the fixed alveolar cells are present in the early stage of influenza-virus pneumonia.

Although the Asian-influenza virus has shown a clear potential pneumotropism for human lung tissue, the pneumotropic " virulence " so far is low, and was most probably enhanced by pre-existing chronic congestion of the lungs (as a consequence of chronic heart-disease), other lung-disease, pregnancy, and perhaps also by secondary bacterial infection.

It is suggested that the second wave of 1918 influenza was caused by a virulent pneumotropic derivative of the swine-type of influenza virus A, and that the 1957 virus may have emerged from an animal carriership.

We are indebted to Dr. R. E. Shope for sending us a pure swine-line of Influenza-A swine virus, and to Dr. R. Q. Robinson for sending us swine-egg-lines isolated in Wisconsin in 1957; to Dr. P. de Baan, Dr. P. M. Bakker, Dr. Th. P. J. Botman, Dr. R. J. Brugge, Dr. C. B. F. Daamen, Dr. R. van Dam, Prof. H. T. Deelman, Dr. O. H. Dijkstra, Dr. S. J. Eggink, Prof. H. N. Hadders, Dr. B. J. C. den Hartog, Dr. I. Ph. Hennemann, Dr. H. de Jager, Dr. C. J. Kooiker, Dr. J. Lankester, Dr. B. J. Mansens, Dr. W. Minder, Prof. A. de Minjer, Dr. J. Panbakker, Dr. H. I. Planteydt, Dr. G. J. Plette, Dr. R. R. Rochat, Prof. Th. G. van Rijssel, Dr. P. H. M. Schillings, Dr. H. C. M. van der Schoot, Dr. H. E. Schornagel, Dr. J. L. Slooff, Dr. J. T. F. Sluiter, Dr. M. Straub, Dr. J. A. M. Unnik, Dr. Th. Vossenaar, Dr. W. F. Winckel, Prof. H. J. G. Wijers, Dr. O. H. van der Zalm, Dr. J. Zeldenrust, for contributing postmortem material; to Dr. O. H. Dijkstra, Haarlem, president of the Dutch Society of Pathologists, for his help in coordinating this study; and to Dr. M. Straub for his interest and criticism.

References at foot of next column

TREATMENT OF LEPTOSPIROSIS WITH OXYTETRACYCLINE

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Over the past fifteen years numerous reports have appeared on the value of different antibiotics in leptospirosis, yet there is still no generally accepted treatment. Many of the reports are unconvincing because of the small numbers of treated cases, because of the absence of control groups, and because of the extreme variability of the disease. Clear-cut laboratory evidence of efficacy has too often been followed by poor results at the bedside.

I describe here a controlled clinical trial of oxytetracycline in Servicemen who contracted leptospirosis during jungle duties in Malaya.

Previous Observations

Penicillin

Penicillin effectively inhibits the growth of leptospiræ in vitro (Alston and Broom 1944, Chang 1946) and modifies the course of leptospirosis in experimentally infected animals. Its effect is much greater if treatment is begun in the early stages of infection (Augustine et al. 1944, Heilman and Herrell 1944, Chang 1946).

The effect of penicillin in human infection is less clear. Early reports were based on few cases, usually jaundiced, and are difficult to assess because of variations in dosage and the absence of controls. The general clinical impression was favourable (Cross 1945, Mackay-Dick and Watts 1949, Suchett-Kaye 1951).

More recently, definite beneficial effects have been demonstrated in greater numbers of cases of anicteric leptospirosis in Queensland, notably with large doses (Doherty 1955, 1956), and similar results are claimed in Malaya for both jaundiced and anicteric cases (Mackay-Dick and Robinson 1957). No controls were studied.

There is no doubt that the overall mortality of leptospirosis has fallen since the introduction of penicillin, but this may be due to improved methods of diagnosis resulting in a higher proportion of anicteric cases (Broom 1951). Penicillin is often ineffective in deeply jaundiced patients (Hutchinson et al. 1946), and a controlled trial in Malaya found it ineffective at all stages of the disease (Fairburn and Semple 1956). In both these reports, however, the dose used was lower than that recommended by those who find penicillin effective (Mackay-Dick and Robinson 1957).

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Chloramphenicol and Tetracycline Derivatives

The tetracycline derivatives are highly effective against leptospiræ both in vitro and in laboratory animals, but chloramphenicol has considerably less action. There is some variation in susceptibility in different strains of organism (Heilman 1948, Schlipköter and Beckers 1951, Smadel 1952).

Information on human infections is scanty. Chloramphenicol is generally regarded as ineffective (Doherty 1955, Fairburn and Semple 1956). Some reports on chlortetracycline (aureomycin) are encouraging (Brainerd et al. 1949, Liebowitz and Schwartz 1951, Doherty 1956), while others have failed to show any benefit (Hall et al. 1951). Only small numbers of cases have been treated.

Methods and Material

Choice of Antibiotic

A controlled experiment, on the lines suggested by Fairburn and Semple (1956), was carried out with oxytetracycline. Trials of this sort involve ethical as well as scientific considerations and can be conducted with a clear conscience only in parts of the world, such as Malaya, where leptospirosis is rarely fatal. Apart from a few isolated reports, no work has been published on the treatment of leptospirosis with oxytetracycline. Experimental observations suggest that it might be of value clinically. It is easy to administer either by mouth or by intravenous injection, and toxic effects are extremely uncommon.

TABLE I—COMPARISON OF DURATION OF PYREXIA AND OF SYMPTOMS IN TREATED AND UNTREATED GROUPS

—	Control	Oxytetracycline
No. of patients	25	27
Days of pyrexia before treatment	3·0	3·9
Days of pyrexia after treatment	6·4	2·5
Total duration (days) of pyrexia	9·4	6·4
Duration (days) of symptoms after treatment	6·9	4·0

Administration and Dosage

The trial was conducted on 52 consecutive patients admitted to the military hospital, Taiping, with a diagnosis of leptospirosis, the diagnosis being confirmed in all cases by blood-culture or serological tests. The patients were all soldiers on active service, aged 18–36 (average 21). 40 patients were British, 9 Gurkha, and 3 Malay.

As far as possible alternate patients were placed in the treatment and control series, this being done by the ward sister.

In addition to the routine observations of temperature, pulse, respiration, and urinary output, a daily record was kept of each patient's symptoms and physical signs by a single observer.

Treatment was started as soon as a provisional diagnosis had been made—in most cases within the first twelve hours in hospital. Patients in the treatment group received oxytetracycline by mouth—an initial dose of 1·5 g. followed by 0·5 g. six-hourly. The large loading dose was often nauseating to the patients if given all at once, and accordingly it was given over an hour or so with small sips of milk.

Antibiotic treatment was continued for at least five days or until the patient's temperature had been normal for forty-eight hours.

If the patient vomited within two hours of receiving the antibiotic, the dose was repeated. If vomiting continued and was severe enough to render oral therapy impossible, oxytetracycline was given intravenously, 1 g. dissolved in 1 pint of glucose-saline solution being run in slowly over eight hours; 3 g. was given in the first twenty-four hours and thereafter 2 g. per twenty-four hours for as long as intravenous treatment was necessary.

TABLE II—TOTAL DURATION OF PYREXIA IN PATIENTS TREATED BEFORE 4TH DAY

—	Control	Oxytetracycline
No. of patients	16	14
Total duration (days) of pyrexia	8·9	5·2

TABLE III—COMPARISON OF BLOOD-UREA LEVELS IN TREATED AND UNTREATED GROUPS (NORMAL BLOOD-UREA <45 MG. PER 100 ML.)

—	Control	Oxytetracycline
No. of patients	25	27
Blood-urea:		
Normal throughout	9	18
Increased before start of treatment	6	3
Increased after start of treatment	7	6
Insufficient data	3	0
No. with azotæmia	13 (*59%*)	9 (*33·3%*)

The tendency to superficial venous thrombosis was countered by the addition of heparin to the infusion, and by introducing this directly into the inferior vena cava via a 'Polythene' catheter in the femoral vein.

Patients in the control group were given ascorbic acid (mg. 50 t.i.d.) as a placebo. All patients received a multiple vitamin-B preparation ('Multivite') daily.

The treatment group contained 27 patients and the control group 25, the difference being due to occasional patients being withdrawn from the series owing to errors in the initial diagnosis or to superinfection with malaria.

The duration of the illness was calculated in two ways: (1) from the onset until the temperature became normal (after peak of fever being disregarded); and (2) from the onset until the patient became symptom-free. Although the temperature chart is on the whole a fair mirror of the patient's progress there are occasions, particularly in severe infections, where a drop in the temperature is a discouraging sign; and for this reason an attempt was made to determine a symptomatic end-point defined as the day on which the patient felt well enough to get up and was free of headache, abdominal pain, and muscular aches. Such an end-point is liable to subjective error both by the patient and the observer, but it was felt that a fair degree of standardisation had been achieved over the whole series when daily records had been kept for eighteen months by the same medical attendant under unchanging conditions of hospital and nursing care.

Comparison was also made between duration of pyrexia in control and treated groups, in cases admitted to hospital before the fourth day of illness. Gsell (1952) recommended this method as a more reliable criterion of effectiveness.

TABLE IV—INCIDENCE OF JAUNDICE IN TREATED AND CONTROL GROUPS

—	Control	Oxytetracycline
No. of patients	25	27
Clinical jaundice:		
Slight	5	4
Severe	0	2
No clinical jaundice	20	21

Results

The results are summarised in tables I and II. It will be seen that treatment with oxytetracycline shortens the duration of pyrexia after treatment from 6·4 to 2·5 days, and the duration of symptoms after treatment from 6·9 to 4 days. The effect of oxytetracycline was also evident in cases treated early in the disease, the average total duration of pyrexia of the treatment group being less than a week (table II). Statistical analysis of the results shows them to be significant.

Tables III and IV show the incidence of renal complications and of jaundice in the two groups, in whom the blood-urea and bilirubin was estimated every fourth day. No statistical conclusions can be drawn from these figures, because of the smallness of the groups. Possibly early treatment prevents the onset of renal damage, but the evidence is no more than suggestive and indeed in some

cases the blood-urea level was observed to rise after the onset of treatment.

The incidence of jaundice was the same in the two groups.

Toxicity

Hay and Mackenzie (1954) estimated that oxytetracycline gave rise to toxic effects in 8% of cases. The great majority of these effects were trivial (pyrexia, urticaria, erythema, sore throat). Very occasionally fulminating gastroenteritis occurred, which in some cases was attributable to overgrowth in the bowel of virulent staphylococci; in others no cause could be found.

The present study confirms the safety of the drug. Diarrhœa, nausea, and vomiting were sometimes provoked, and this led on occasions to the abandoning of oral therapy in favour of intravenous administration. Absorption of oxytetracycline tended to be erratic, and occasionally the capsules were passed unchanged in the stools. No intramuscular preparation was available at the time. Apart from these disadvantages no toxic effects were encountered.

Discussion

It is evident that oxytetracycline, like other antibiotics, is less effective in vivo than in vitro. Although the present study shows that it may be safely administered and can shorten the period of fever and of symptoms, it does not appear to prevent the hepatic and renal complications and cannot be regarded as wholly satisfactory.

Therapy may have been begun too late—experimental evidence has clearly shown the importance of early treatment—but conditions in the Army are ideal in this respect, and it is difficult to see how the interval between infection and the onset of treatment (3·9 days in the present series) could have been shortened. In fact in civilian practice and in areas where the disease is less common, it must inevitably be longer.

It has been suggested that some of the difficulties in treating leptospirosis may be due to the existence of an exotoxin which is unaffected by antibiotics (Smadel 1952). Antileptospiral serum, however, gives disappointing results. Hepatic and renal damage are certainly aggravated in some cases by vascular hypotension, and measures should be taken to raise the blood-pressure if it falls to dangerously low levels.

Search must continue for an antibiotic capable of preventing renal and hepatic damage and of limiting the extent of such damage if it has already occurred. For the present, oxytetracycline or penicillin in high dosage (5–10 mega units per twenty-four hours) remain the treatments of choice.

Summary

A controlled series of 27 cases of leptospirosis treated with oxytetracycline is reported.

The duration of fever and of symptoms was significantly shorter in the treated group, but the incidence of renal and hepatic damage was unaltered. There were no significant toxic effects.

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INTRAVENOUS LIGNOCAINE AS AN ANTICONVULSANT

IN STATUS EPILEPTICUS AND SERIAL EPILEPSY

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STATUS epilepticus means a series of epileptic attacks without intervening periods of consciousness; in serial epilepsy consciousness is regained between successive fits. Both conditions are distressing and difficult to treat, and any promising new method deserves consideration.

Because of an observation of Halldin (1954), Bernhard and Bohm (1954a and b) were led to study the effects of some local anæsthetics on experimental convulsions in animals. They found lignocaine to be the most effective. Bernhard et al. (1955) then tried lignocaine in patients with status epilepticus or serial epilepsy. The results suggested that the drug was an anticonvulsant. But epilepsy is an unpredictable disorder, and their studies were not controlled.

The Trial

We describe a rigorously designed trial that demonstrates the efficacy of lignocaine as an anticonvulsant. Since suitable patients were likely to be few, the trial was designed to extract the maximum information from each.

The principle adopted was to introduce a solution—either saline or lignocaine—into an intravenous saline drip immediately after a fit, and to measure the subsequent fit-free interval. Twelve such injections constituted a test. For each test, 12 bottles (6 containing normal saline and 6 containing a solution of lignocaine hydrochloride) were made up. They were randomly arranged, in sets of 4 or 6, and numbered consecutively. The key to each set was sealed and locked away, and was opened only after the test was completed. The nature of the solutions was thus unknown to anyone concerned in carrying out the tests.

In each test the contents of the 1st bottle were injected into the drip-tube immediately after a fit, and the interval before the next fit began was recorded. At the end of the second fit the contents of the 2nd bottle were added to the drip, and so on, until the contents of all 12 bottles had been administered, and the thirteenth fit in the series had begun. Each test thus afforded twelve fit-free intervals—six after lignocaine and six after saline.

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TABLE I—RESULTS OF 6 TESTS ON THREE PATIENTS
(Numerals are intervals in minutes between successive fits.)

Case no.	1						2				3	
Test no.	1		2		3		4		5		6	
Injection no.	Saline	Lignocaine (200 mg.)	Saline	Lignocaine (200 mg.)	Saline	Lignocaine (200 mg.)	Saline	Lignocaine (400 mg.)	Saline	Lignocaine (400 mg.)	Saline	Lignocaine (200 mg.)
1	—	35	14	—	1	—	32	—	—	25	—	11
2	1	—	16	—	—	5	28	—	15	—	15	—
3	—	43	—	14	—	10	—	20	5	—	5	—
4	4	—	—	36	9	—	—	210	—	240	—	29
5	12	—	19	—	2	—	20	—	—	135	—	38
6	—	34	—	53	—	24	—	15	3	—	11	—
7	—	21	15	—	1	—	15	—	70	—	7	—
8	7	—	—	44	1	—	—	30	—	145	—	24
9	—	29	—	46	—	24	—	5	—	180	—	36
10	10	—	9	—	—	28	210	—	21	—	10	—
11	4	—	6	—	8	—	—	385	12	—	7	—
12	—	24	—	24	—	38	5	—	—	193	—	27
Mean	6·3	31·0	13	36	3·7	21·5	51·7	110·8	21	153	9·2	27·5
t	6·69		3·32		3·48		0·83		4·23		4·34	
P	<0·001		0·01–0·001		0·01–0·001		0·4–0·5		0·01–0·001		0·01–0·001	

We studied three patients, and 6 tests were made—3 on the first patient (on 2 separate admissions to hospital), 2 on the second patient, and 1 on the third patient. Lignocaine hydrochloride was used as 1% or 2% w/v solution in sterile water. The dose given in any one injection was either 200 or 400 mg., and the rate of injection was always less than 100 mg. per minute.

We also studied two of the patients to determine whether the anticonvulsant action of lignocaine was related to the dose. 12 injections, consisting of four doses of lignocaine (37·5, 75, 150, and 300 mg.), randomly arranged in sets of 4, were numbered as for the earlier observations, and given in order immediately after each of a series of twelve fits. The response was, as before, the interval in minutes between the end of one fit and the beginning of the next.

Ethical Aspects

Trials of new drugs, or of new uses for old drugs, present inescapable ethical problems. Whenever possible, the consent of the patients or their relatives should be obtained beforehand. The nature and aim of our tests were fully explained to the relatives (one a senior nursing sister) of cases 1 and 3, and they readily agreed. No relatives of case 2 were available, and the patient was unable to give or withhold consent.

All three patients had had repeated fits which did not respond to orthodox anticonvulsant therapy. This in itself gave justification for trying a new treatment. In the event, the information gained from these tests was used later in the successful control of their fits, and no ill effects were seen.

It might be argued that an anticonvulsant, such as soluble phenobarbitone, should have been used for the control injections instead of saline. But, because phenobarbitone is synergistic with lignocaine in its anticonvulsant action (Bernhard et al. 1955), its use would have spoilt the trial. An inert control was an essential feature of the design.

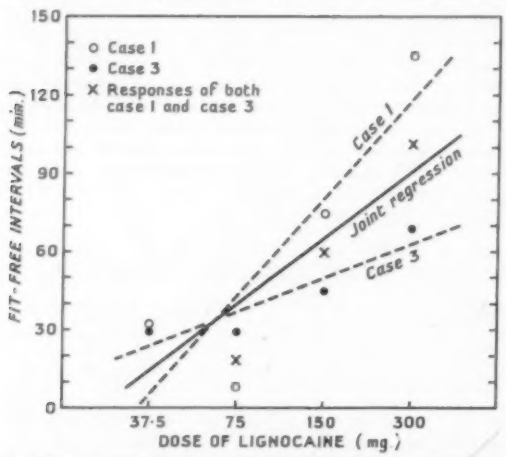

Fig. 1—Calculated dose-response regressions from results in table II. If the lowest dose is ignored, the mean responses for the other three doses fit exactly on a straight line (P=1).

TABLE II—RELATION BETWEEN DOSES AND RESPONSE. EACH OF THE TWO PATIENTS HAD 3 SETS OF FOUR DOSES GIVEN IN THE ORDER SHOWN. THE RESPONSE IS THE INTERVAL IN MINUTES BETWEEN CONSECUTIVE FITS

Injection no.	Dose of lignocaine (mg.)	Response (min.)	
		Case 1	Case 3
1	75	8	22
2	150	158	33
3	37·5	5	23
4	300	190	56
5	75	12	19
6	300	47	70
7	37·5	21	13
8	150	61	23
9	300	170	80
10	75	3	43
11	37·5	66	52
12	150	5	80

Case-reports

Case 1.—A housewife, aged 65, had had epilepsy since 1949. Despite regular treatment with phenobarbitone and phenytoin sodium she had had intermittent grand-mal attacks, and several severe and prolonged bouts of serial jacksonian fits. These affected the face, hand, and foot of the right side, and were associated with aphasia. She did not seem to be unconscious during or after the fits, which recurred every 5 to 10 minutes in bouts lasting from 1 to 3 weeks. There were at least seven bouts, and she was studied in the sixth and seventh of these, in February, 1955, and in March, 1956. Between 1949 and 1956 her neurological condition slowly deteriorated, and by 1956 she had a permanent, mild, right hemiparesis, with slight dysphasia which was predominantly motor in type. She had been investigated in two neurosurgical centres, but surgery was not advised.

Diagnosis.—Focal epilepsy secondary to ? left cerebral glioma.

Case 2.—A farm worker, aged 31, had had recurrent major and minor fits since the age of 13. His epilepsy was usually well controlled on primidone ('Mysoline') 1·5 g. daily, but on the day of admission he had ten major fits before reaching hospital, and he did not regain consciousness between attacks.

Diagnosis.—Centrencephalic epilepsy.

Case 3.—A sweet manufacturer, aged 53, had had several major fits and numerous myoclonic jerks during the previous

10 years. On the day of admission to hospital he had repeated jacksonian fits affecting the right side of the face, associated with aphasia, and with head-turning to the right. He was conscious between attacks. Investigation later showed a left-sided cerebral tumour.

Diagnosis.—Focal epilepsy secondary to a left cerebral tumour.

Results

Table I shows that, except in test no. 4, lignocaine produced a highly significant lengthening of the interval between fits. As the trial was of the double-blind variety the results afford unequivocal evidence that lignocaine, in the doses used, had some anticonvulsant action in these three patients.

The results of the tests to relate the anticonvulsant action of lignocaine to the dose are shown graphically in fig. 1 and in detail in table II. Analysis shows (table III)

TABLE III—ANALYSIS OF VARIANCE OF DOSE-RESPONSE DATA IN TABLE II

Item	df	SS	MS	VR	t	P
(1) Regression ..	1	20072·53	20072·53	12·430	3·53	0·01–0·001
(2) Linear regression	1	4428·16	4428·16	2·742	1·66	0·2–0·1
(3) Quadratic regression	1	885·63	885·63	0·548	0·74	0·5–0·4
(4) Between subjects	1	2242·67	2242·67	1·388	1·18	0·3–0·2
(5) Parallelism of subject regressions	1	4563·33	4563·33	2·826	1·68	0·2–0·1
(6) Between times ..	2	4329·75	2164·88	1·340	..	>0·2
Residual	16	25835·93	1614·75	..	..	..
Total ..	23	63358·00				

that there is a linear relation between the logarithm of the dose and the response ($P = 0{\cdot}2 - 0{\cdot}1$), and that as the dose is increased the interval between fits increases significantly ($P = 0{\cdot}01 - 0{\cdot}001$).

The seeming differences between the patients, and the lack of difference between the effect of the two lowest doses, cannot be shown to be real. This is because of the large variation in response, which has a standard deviation of the mean of 23·2 min. for either patient at any particular dose.

Discussion

The results establish that lignocaine hydrochloride had an anticonvulsant action in these three patients—two with focal epilepsy of the jacksonian type, and one with grand-mal epilepsy of the centrencephalic or so-called idiopathic type. This effect was of the graded variety and was linearly related to the logarithm of the dose.

The technique adopted is efficient and economical, and provides reliable information from the careful study of a few patients. With suitable modifications, it could be used not only to evaluate different anticonvulsants in status epilepticus, but also to assess the effects of drugs in other illnesses where signs or symptoms recur at intervals.

Summary

The effect of intravenous lignocaine hydrochloride was studied by a double-blind trial in three patients with status epilepticus and serial epilepsy.

It had an anticonvulsant action which was graded, and which had a linear relationship to the logarithm of the dose.

We are indebted to Prof. R. E. Tunbridge for permission to treat case 1; to Dr. Maxwell Telling for transferring case 2 for treatment; to the medical students who acted as observers; and to Dr. J. G. Dare for some of the calculations.

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INTRAVENOUS PHENYTOIN SODIUM IN CONTINUOUS CONVULSIONS IN CHILDREN

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CONTINUOUS convulsions are serious pædiatric emergencies requiring prompt and energetic treatment. In uncontrolled convulsions death may occur (Whitty and Taylor 1949, Williams 1955), and in children surviving prolonged convulsions there is the serious risk of mental deterioration.

Since the virtual disappearance of rickets, the common causes of convulsions in infancy and childhood are pyrexia in predisposed children which produces so-called febrile convulsions, " idiopathic " epilepsy, cerebral palsy, meningitis, and some forms of birth injury in which there is intracranial bleeding or cerebral anoxia.

Most convulsions end spontaneously after a few minutes, but occasionally they are prolonged, or they may occur in rapid succession, often with the patient remaining unconscious throughout.

Various methods for the control of convulsions have enjoyed considerable vogue in the past. These have included placing the child in a warm bath (a highly dangerous procedure with a convulsing child and an absent cough reflex); dilatation of the anus; the intravenous injection of 50% sucrose solution; lumbar puncture (difficult in a convulsing child, and dangerous because the needle may break); inhalations of 5% carbon dioxide and 95% oxygen, or ether, or chloroform; and injections of morphine (very dangerous in children).

Parenteral injection of barbiturates or paraldehyde is the form of therapy commonly used today. Paraldehyde is usually considered safer than the barbiturates because the risk of respiratory depression is less. Some authorities (Whitty and Taylor 1949, Williams 1955 and 1958, and others) regard this as the method of choice. But deaths have been reported after the use of paraldehyde in doses appropriate for the condition. Goodman and Gilman (1955) comment on the variability of the recorded fatal doses, and suggest that other factors, such as liver damage, may cause hypersusceptibility to the drug. Moreover, since paraldehyde is a polymer of 3 molecules of acetaldehyde, oxidation to acetic acid may occur if it is kept for some time, and at least one death has been reported from this cause (*British Medical Journal* 1956). Also abscess formation and damage to nerve trunks may complicate the use of paraldehyde intramuscularly.

In 1949, the pharmacy department of the Massachusetts General Hospital prepared a parenteral form of diphenylhydantoin or phenytoin sodium ('Dilantin Sodium' or 'Epanutin') for use in convulsions during and after neurosurgical operations, when oral therapy was impossible. Because of the increased sensitivity of the brain under these circumstances, barbiturates were considered unsuitable. Phenytoin sodium seemed to be the drug of choice since it does not impair consciousness or depress respiration. Murphy and Schwab (1956) described the preparation of the injection, and reported their results in treating the convulsions associated with neurosurgical procedures over a period of 5 years; they also used this drug in three adults with continuous convulsions due to other causes. No side-effects were observed.

More recently, Carter (1958) has also used phenytoin sodium intravenously at the Florida Farm Colony. He treated 71 attacks of status epilepticus in forty-two patients. Six of the patients were over 21, four were 5 years old or less, and the remainder were aged 5 to 21. Twenty-two patients were male

and twenty were female. The drug was injected at a rate not exceeding 1 ml. (i.e., 50 mg.) per minute. A dose of 250 mg. was found to control most episodes of status epilepticus, but some cases needed a further 250 mg. After the patient regained consciousness, phenytoin or other anticonvulsant was usually given by mouth, though a few cases required phenytoin intramuscularly in doses of 250 mg. 4-hourly or 6-hourly for 2 to 3 days. Of 121 episodes of status epilepticus in eighty-five other patients, 97 were controlled by one intravenous injection of 250 mg. of phenytoin. Of the remaining 24 episodes, 17 were controlled by a second intravenous dose of 250 mg., and 7 episodes in five patients required the addition of some other drug. 3 of these refractory convulsions occurred in one patient. After the status epilepticus ceased, these five patients were controlled by intramuscular injections of phenytoin in doses of 250 mg. 6-hourly for 2 or 3 days. In the whole of Carter's series, no sedation or other side-effect was noted, and respiration was never depressed.

Preparation of the Injection

The injection is prepared by adding 5 ml. of diluent to 250 mg. (gr. $3^3/_4$) of powdered phenytoin sodium in a rubber-capped vial, and shaking until solution is complete. The phenytoin dissolves slowly, and from 5 to 10 minutes of shaking are required, although the process may be accelerated by warming. The solution should be clear, and is best used within 2 to 3 hours of preparation. It should not be used if there is any discoloration. The dry phenytoin has a long " shelf life ", and investigations are in progress to determine the stability of the solution.

Case-reports

Case 1.—A boy aged 8, who was a known epileptic, developed follicular tonsillitis and right-sided otitis media. When he was admitted to hospital he had been in status epilepticus for 4 hours. 15 minutes later, 3·5 ml. (i.e., 175 mg.) of intravenous phenytoin was given over a period of 5 or 6 minutes. The fits stopped 6 minutes after the beginning of the injection, and he gradually regained consciousness. Amylobarbitone gr. 1 q.i.d. was then given by mouth. During the next 2 days, he had 6 more grand-mal fits, but these were all short.

Case 2.—A girl, aged 1 year, had previously had 2 convulsions associated with pyrexia and infection of the upper respiratory tract. During another similar illness, she was admitted to hospital unconscious, having had continuous convulsions for $1^1/_2$ hours. She was given intramuscular amylobarbitone gr. $^1/_2$, followed 30 minutes later by 3·5 ml. of intravenous phenytoin injected slowly. This had no effect, and after another $^1/_2$-hour, a further 3 ml. of phenytoin was given. There was still no response other than slight, transient slowing of the convulsive movements. After a further $^1/_2$-hour she was anæsthetised with ether and oxygen, and the convulsions ceased. Amylobarbitone was given intramuscularly—gr. $^1/_2$ and then gr. $^1/_4$ 6-hourly. She gradually regained consciousness and had no more convulsions.

Case 3.—A girl, 3 months old, collapsed with cardiac arrest during an operation for resection of reduplication of the ileum, and was anoxic for 20–30 minutes. The heart was eventually restarted by cardiac massage. $3^1/_2$ hours later she developed generalised convulsions, which stopped within 3 minutes of the intravenous injection of 1 ml. of phenytoin via a scalp vein. She died 2 hours later.

Case 4.—A boy, aged $4^1/_2$, had been born prematurely (birth-weight 3 lb.). He had a long-standing squint and a congenital defect of the skull. He got bronchitis, with collapse of the right middle lobe of the lung, and was admitted to hospital unconscious, having had continuous convulsions for $5^1/_2$ hours. He was febrile, cyanosed, and frothing at the mouth. The pharynx was aspirated, and he was given oxygen by face-mask. Intramuscular atropine was given, and 3 ml. of intravenous phenytoin was injected slowly after a delay of 15 minutes in finding a suitable vein. The convulsions stopped within a minute of completing the injection, and he gradually regained consciousness. Phenobarbitone gr. $^1/_2$ was then given intramuscularly, and continued orally in a dose of gr. $^1/_8$ t.i.d.

This child was readmitted to hospital $4^1/_2$ months later, after a further convulsion lasting about $2^1/_2$ hours, which ended spontaneously before admission. He had tonsillitis, and gave the impression of being mentally retarded.

Case 5.—A girl, aged 6, was mentally defective and had a spastic quadriplegia. She had had occasional convulsions, but these were well controlled with phenobarbitone. She developed a respiratory infection and was admitted to hospital after being in status epilepticus for 3 hours. 4 ml. of intravenous phenytoin was given slowly. The convulsions ceased within 3 minutes of starting the injection, and consciousness slowly returned. Phenobarbitone gr. $^1/_4$ t.i.d. was then given by mouth.

Case 6.—A boy of 18 months had a spastic paraplegia and was mentally retarded. He got follicular tonsillitis, and was admitted to hospital after he had had continuous convulsions for about 3 hours. He was obese, and the veins were difficult to locate. Mucus was aspirated from the mouth and pharynx, and he was given oxygen. Less than 1 ml. of phenytoin was given via a vein of the dorsum of the hand. 5 minutes later, a further 3 ml. of phenytoin was given very slowly via the external jugular vein, after attempts to locate other veins had failed. The convulsions stopped within 5 minutes of the second injection. He was then given amylobarbitone gr. 1 intramuscularly.

30 minutes later he became increasingly restless and after 10 minutes again went into generalised convulsions. Another 4 ml. of phenytoin was given, via the external jugular vein, and this was effective within 3 minutes. There were no further convulsions and consciousness gradually returned.

Case 7.—A boy, aged $3^1/_2$, with a spastic quadriplegia and mental deficiency had previously had a convulsion which lasted 6 hours. He developed follicular tonsillitis which was associated with continuous convulsions, and after about 2 hours of these he was admitted to hospital. 4 ml. of intravenous phenytoin had no effect on his unconscious state, and there was only transient lessening of the convulsive movements. 25 minutes later, a further 4 ml. of intravenous phenytoin was given slowly and the convulsions ceased within 5 minutes. Amylobarbitone gr. $^1/_2$ was given intramuscularly and continued 6-hourly by mouth. There were no further convulsions, and he took food voluntarily $3^1/_2$ hours later.

Case 8.—A male infant, born 6 days previously, had gross moulding of the head. He was very limp and lethargic for 5 days after birth. On the 5th day he became febrile and irritable, with generalised increase of muscle tone and twitching of all four limbs. Intramuscular amylobarbitone gr. $^1/_4$ was given, with transient improvement. 2 hours later, however, he had 2 grand-mal fits. The fontanelle tension was thought to be normal. Amylobarbitone gr. $^1/_2$ was then given, but he remained irritable and the twitching continued. An hour later, after a further gr. $^1/_4$ of amylobarbitone, the child settled. But again, 2 hours later, he became unconscious, and developed convulsions. When these had continued for 45 minutes, 1 ml. of phenytoin was given slowly via a scalp vein, with only slight and transient modification of the convulsive movements. The needle then became dislodged accidentally. 15 minutes later a further 3 ml. of phenytoin was given slowly. The convulsions stopped within 10 minutes of the second injection, although the child remained very irritable. Lumbar puncture then revealed an *Escherichia coli* meningitis, and intramuscular chloramphenicol therapy was started. He was also given amylobarbitone. There were no further convulsions, but he died next day. At necropsy, in addition to the meningitis, there was a small tentorial tear and atelectasis of the left lower lobe of the lung.

Case 9.—A microcephalic, mentally defective boy, aged 11, had had frequent fits of short duration for 4 years although he had taken phenobarbitone regularly. He got an infection of the upper respiratory tract and was in status epilepticus for $4^1/_4$ hours. This ended spontaneously an hour before admission to hospital, but he then had several intermittent generalised

fits at 5-minute intervals, each lasting about 5 minutes. A fit had just ended before the intravenous injection of 5 ml. of phenytoin. 10 minutes later, he had another fit, lasting 3 minutes, after which there was marked facial twitching. Because he was still irritable, a further 5 ml. of intravenous phenytoin was given 30 minutes after the first injection, followed by intramuscular amylobarbitone, gr. $^1/_2$ 6-hourly. He had no more fits and gradually regained consciousness.

Case 10.—A girl, aged 5, who had had occasional fits, developed right-sided otitis media and tonsillitis. After having continuous convulsions for $1^1/_4$ hours, she was admitted to hospital. 4 ml. of intravenous phenytoin was given slowly and the convulsions gradually stopped (except for slight facial twitching) within 10 minutes. 5 minutes later she had another generalised convulsion, but this lasted only 2 minutes. There were no further convulsions and she slowly regained consciousness.

Case 11.—A girl, who was nearly 4 years old, got an infection of the upper respiratory tract and had 2 bouts of convulsions, each lasting an hour. She was admitted to hospital during further convulsions, which started about $1^1/_2$ hours later. She was given oxygen and a very slow intravenous injection of 0·5 ml. of phenytoin. All convulsive movements stopped within 5 minutes. Phenobarbitone gr. $^1/_2$ was given intramuscularly and continued by mouth in a dose of gr. $^1/_4$ b.d. There were no further convulsions during 5 days' stay in hospital.

Discussion

In ten of these eleven children the continuous or recurrent convulsions, which had shown no signs of terminating spontaneously, ceased after intravenous phenytoin sodium was given. In only one patient did the drug have no effect. In six patients (cases 1, 3, 4, 5, 10, and 11) the convulsions ended within 10 minutes of the start of one slow intravenous injection of phenytoin, the doses being 175, 50, 150, 200, 200, and 25 mg. respectively. Of the remainder, three (cases 7, 8, and 9) had two injections separated by a period of 15 to 30 minutes before the convulsions stopped; the total dosages were 400, 200, and 500 mg. respectively. Had the needle not become dislodged from the scalp vein in case 8 the convulsions would probably have been controlled by one injection. In case 6 the convulsions ceased after the first intrajugular injection but returned about 45 minutes later; after a second intrajugular injection they stopped and did not recur. None of the patients had had any drugs before admission to hospital. Except for cases 2 and 8, barbiturates were not given until after the convulsions had ceased.

The interval between the intravenous injection of phenytoin and the cessation of the convulsions was usually less than 10 minutes, which is much shorter than the interval to be expected when paraldehyde is used. Whitty and Taylor (1949) state that intramuscular injection of paraldehyde in doses appropriate to the patient's age usually stops the fits of status epilepticus within 30 minutes.

The total dosages of phenytoin used in these eleven cases have varied from 25 to 500 mg. According to Schwab (1953), the adult dose in status epilepticus is 250 mg. although 500 mg. can be given, provided the rate of intravenous injection does not exceed 100 mg. per minute. He suggests that 20 minutes should elapse before regarding a dose as a failure, especially if other anticonvulsants have been given previously. In 1956, however, Murphy and Schwab recommended 150–250 mg. of phenytoin as being a suitable intravenous dose for an adult in severe status epilepticus, with a further 100–150 mg. if necessary after 30 minutes. Information as to the dosages for children is not very plentiful. Murphy and Schwab (1956) suggest that 100 mg. of phenytoin is suitable for a 70 lb. child. Carter (1958) gives no details of the dosages in his series.

Although most of the children in this series were given larger doses of phenytoin than those suggested by Murphy and Schwab (1956), no side-effects or toxic manifestations were noted. Mental deficiency or the " pre-speech age " of most patients precluded description of subjective symptoms, but the others did not complain of anything untoward.

A practical difficulty was that in several children suitable veins were inaccessible, and in two or three of the cases described this was responsible for delay in control.

Experience with this small series of eleven cases suggests that intravenous phenytoin is a safe, speedy, and effective method of controlling continuous convulsions in children. Certainly, the drug merits further trial.

Summary

In America, intravenous phenytoin sodium (' Epanutin ') has been used for controlling status epilepticus.

Details are given of the preparation of phenytoin sodium for intravenous injection, and of its use in eleven children suffering from continuous convulsions of differing ætiology. The dosages ranged from 25 to 500 mg., and the injection was usually effective within 10 minutes.

The results confirm previous suggestions that intravenous phenytoin is a very effective drug for controlling convulsions in children.

I am grateful to Dr. E. G. Fox, Dr. J. D. Pickup, and Dr. I. D. Riley for permission to treat children admitted to hospital under their care, and for valuable advice and criticism; and to Messrs. Parke, Davis & Co. for supplies of intravenous phenytoin sodium (' Epanutin ').

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IMMEDIATE EFFECTS OF IRRADIATION OF ELASTIC TISSUES WITH X RAYS, RADIUM, AND RADIOACTIVE COBALT

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In the sixty years since the discoveries of Röntgen and Becquerel much work has been done on the delayed deleterious and therapeutic effects of exposure to radioactive substances and X-radiation, a good deal less on the crucial immediate effects. These immediate effects may be latent, and seem to defy investigation: the delayed effects are inevitably obscured by biological reactions (Bloom 1948, Spear 1953, 1958).

Study of the lesions of electricity led to discussion of the peculiar effects of electric current and lightning on the structure and function of elastic tissue (Jellinek 1955). The investigation of normal elastic fibres was initiated over a century ago by Henle, and the many remaining problems in this field have recently been reviewed by Cox (1957). The effects of electricity on elastic tissues seemed so extraordinary that they suggested the present study on the impact of radiation on elastic tissues—that is, a study immediately after the experimental irradiation.

While the results of the above-mentioned electrical effects were gathered mostly from elastic tissues of human skin and blood-vessels, it was felt that more compact elastic tissues would offer technical advantages in the present study. Accordingly, the bulk of the work was done on the ligamentum nuchæ of the calf fœtus. This ligament, which is well developed in the calf fœtus, has a uniform elastic structure and is easily dissected out and manipulated.

The purposes of this study were:

1. To gain some insight into the mode of action of radiation on elastic tissue, the maximal effect of which is shown in the complete fragmentation of the normal elastic network of human skin (fig. 1) after irradiation with 2520r (fig. 2).
2. To obtain a scale of effects by varying the quantity of radiation, particularly within the ranges of radiotherapeutic practice.
3. To compare the response of the tissues in fœtuses of different age.
4. To compare the effects of X rays and radium.
5. To study the effects on blood-vessels.

Method

The ligamentum nuchæ of ten calf fœtuses and the skin from five recently deceased human corpses were treated as far as possible in the same way, except for the deliberate variation of the experiments. The ligamentum nuchæ was dissected out at the Vienna slaughterhouse, and taken at once to the Zentral-Röntgeninstitut of the University of Vienna, where it was cut into 1 cm. lengths with scissors, and exposed to radiation.

This consisted of X rays in the majority of cases, delivered by routine radiotherapy machines at 200 kV, focus-object-distance (F.O.D.) 20 cm., 0·2 mm. copper filter. F.O.D. was 50 cm. in the experiments below 200r. In a few experiments radium and radioactive cobalt were used, and in all cases the quantity of irradiation is recorded below in r, and the duration of the exposure expressed in parentheses. Immediately after irradiation the tissue fragments were placed in formol saline, taken to the Institute of Pathological Anatomy of the University, and stained with hæmatoxylin and eosin, van Gieson, and orcein.

Human skin was obtained a few hours postmortem from presumably healthy specimens—i.e., youthful victims of trauma—and in one case a stillborn seven-month infant. It was treated similarly to the fœtal calf material.

Blocks of elastic fibres from a single calf fœtus were exposed concurrently to variable conditions in the different experiments, and some were left unirradiated for control studies. Where radium or cobalt was used this is indicated in the text; otherwise X rays were used.

The amounts of X rays used on ligamentum nuchæ were: 1, 2·5, 5, 10, 25, 100, 200, 312, 840, 940, 1250, 1670, 1680, 1875, 2520, 5620, 16,700, 16,860, 27,000, and 50,000r. The effects of 4000 and 40,000r of radium on ligamentum nuchæ and of 960 and 2880r of radioactive cobalt on human skin were studied in addition to the effects of X rays of 840, 1680, 2520, 10,000, 20,000, and 30,000r on human skin.

Results

Sections of the unirradiated portions of the ligamentum nuchæ of the calf fœtuses showed the expected normal uniform structure of elastic fibres; gaps between fibres are empty.

Irradiation produced a wide range of morphological changes in the compact elastic tissues of the ligaments: from slight curling and spur and "hair" formation on individual fibres to disruption and dislocation of the majority of the fibres (fig. 3, radium 40,000r [13½ hours]). Occasionally very large doses produced complete fragmentation of the elements of the compact ligament

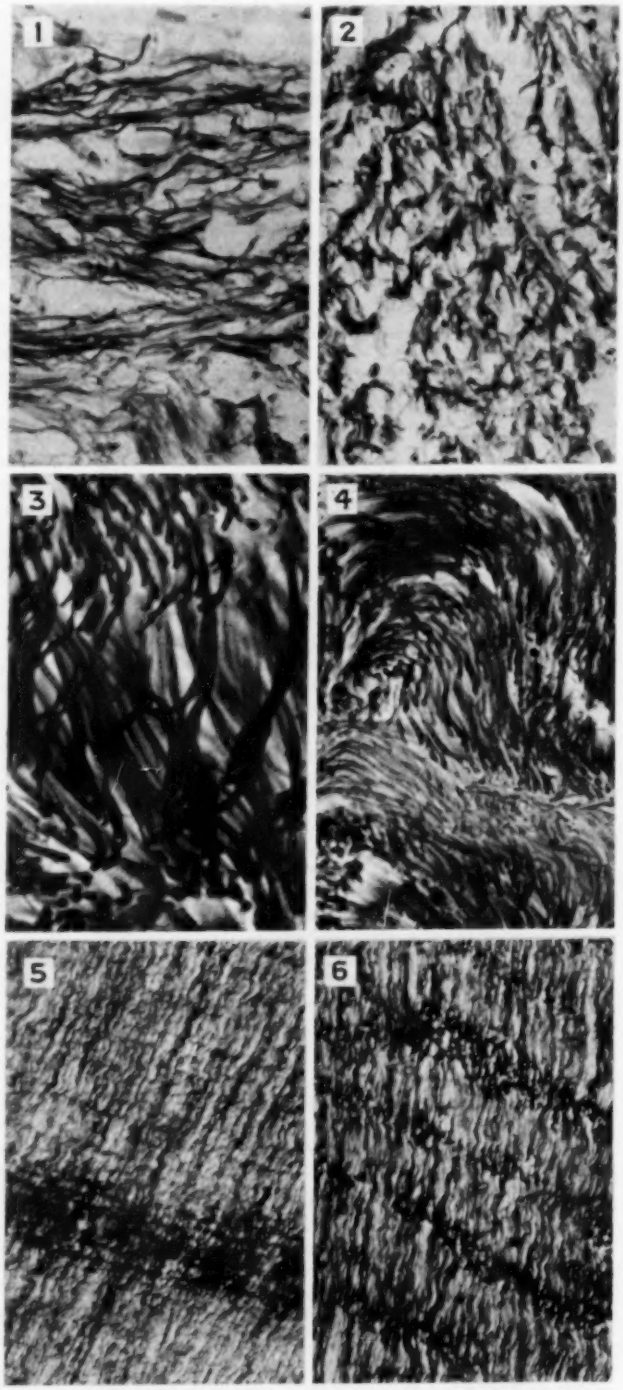

Fig. 1 — Skin from a stillborn seven-month human fœtus; not irradiated. (×300.)

Fig. 2 — Skin from a stillborn seven-month human fœtus after 2520r (18 minutes). (×300.)

Fig. 3 — Ligamentum nuchæ of calf fœtus after radium 40,000r (13½ hours). (×600.)

Fig. 4—Ligamentum nuchæ of calf fœtus after radium 40,000r (13½ hours). (×350.)

Fig. 5 — Ligamentum nuchæ of calf fœtus after 200r (4 minutes). (×140.)

Fig. 6—Ligamentum nuchæ of calf fœtus after 25r (5 minutes). (×140.)

Fig. 7—Subcutaneous blood-vessel from a 17-year-old male after cobalt irradiation 960r (8 hours). (×300.)

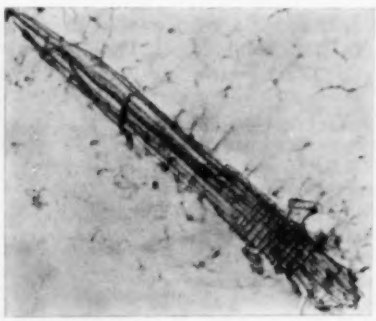

Fig. 8—Subcutaneous blood-vessel from a 16-year-old female after 1680r (2 minutes). (×400.)

similar to that in the fine network of the human skin (fig. 2).

At times there was juxtaposition of coarsely disruptive effects with contrasting orderly arrangements, or rearrangements, of fibres—dome-shaped as in fig. 4 (radium 40,000r [13½ hours]—and with confluent enigmatic formations, possibly altered elastic tissue (fig. 4, lower half). Numerous such profound alterations were observed and suggested physicochemical changes of the tissues, in addition to the more mechanical changes in the morphology of the fibres.

Many attempts were made to obtain a quantitative scale of these irradiation effects; the middle "therapeutic" range of the experiments produced the most pronounced morphological changes. The very high ranges produced more "inner-structural" alterations.

Ligamentum nuchæ from a four-month calf fœtus was more affected than tissues from an eight-month fœtus.

A study of the lower therapeutic range and lesser irradiations (down to 1r) showed a third, and less tangible, kind of change—that is, geometrically arranged transverse lineaments on the fibres without obvious alteration of shape or inner-structure—cf. fig. 5 (ligamentum nuchæ after 200r [4 minutes]) and fig. 6 (ligamentum nuchæ after 25r [5 minutes]). Delicate changes of this kind were detectable even at 1r, and a threshold for these effects was not found.

Irradiation changes in human subcutaneous blood-vessels in these experiments were surprisingly ubiquitous and consisted in fissuring of the vessel walls, and in strange parallel lineaments—fig. 7 (cobalt 960r [8 hours]) and fig. 8 (X rays 1618r [2 minutes]).

Peculiarly thermal effects were not found.

Discussion

The irradiation effects described here are all broadly alike, whatever the method (X-rays, radium, or radioactive cobalt). If anything, an equivalent radium dosage seemed to have a greater effect on elastic tissues (figs. 3 and 4).

At first sight the wide range of dosage from 1r to 50,000r as a cause of comparable histological effects seems surprising, but there is a corollary in the range of 4r to 70,000r of the sublethal effects on cell mitosis (Spear 1958).

Histological methods undoubtedly reveal only some of the immediate effects of irradiation; but the changes seem worth analysing as they throw light on the modes of action of irradiation.

Basically, the alterations are of one of two types:

1. Morphological changes consisting chiefly in fragmentation and disarray of the fibres (cf. figs. 1–3), suggesting a mechanical mode of action of the irradiation.

2. Changes of inner texture, suggesting physicochemical mechanisms, and demonstrated by swelling of the elastic fibres, their impaired staining capacity and partial transparency, and the enigmatic debris formation between fibres (fig. 4).

The parallel graphic lineaments shown in figs. 5 and 6 are particularly striking but impossible to classify exclusively in either category: it may be a combined effect, and was more commonly seen below 25r.

The nature of the inner structural changes is particularly intriguing, as it is presumably the starting-point of all the delayed effects of irradiation.

The presumed transformation of the elastic fibres into translucent structures (fig. 4) seems to be analogous with the transient and reversible alteration of elastic tissue into plastic tissue after the action of electricity (Jellinek 1955).

The postmortem irradiation effects on the blood-vessels of the human skin are very apparent and a little alarming; but in vivo the same dosage may act differently on a full vessel. Criticism of this kind applies to all postmortem experiments, but it is hoped that this study will lead to in-vivo investigations and help to elucidate the mode of action of radiation.

Summary

Postmortem radiation experiments were carried out on the ligamentum nuchæ of fœtal calves and on human skin to study the immediate effects on elastic tissue.

X rays, radium, and radioactive cobalt in quantities ranging from 1r to 50,000r were used, and the material was studied histologically.

Changes were found in all experiments, and the threshold seemed to lie outside the range examined—i.e., below 1r.

I am obliged to Dr. F. Stoffl for providing the fœtal material; to Prof. E. G. Mayer, Prof. J. Tappeiner, and Dr. F. Wachtler for help with the irradiations; to Prof. H. Chiari and to Dr. Obiditsch Mayer for help with the histological preparations; and to Prof. A. V. Hill and to Mr. E. H. Leach for stimulating discussions.

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"... the future of medical service is not to be envisaged as a continued refinement, as well as increase, in the specialties, with the consequent parceling out of the patient to a host of men, who will care for him and treat his illnesses. I think rather that within two generations ... medicine as a science, and medical service perforce, will have undergone a revolutionary change. ... This revolution will not be brought about by the economic, legislative, or social manipulations of well-meaning men but by the maturation of those knowledges and intelligences embraced in physiological, and in ecologic, medicine."—Dr. IAGO GALDSTON, *J. Amer. med. Ass.* Aug. 23, 1958, p. 2056.

THE NATURAL HISTORY OF HYDROCEPHALUS

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LITTLE is known of the incidence of spontaneous arrest of hydrocephalus. The purpose of this investigation was to determine in what proportion of children seen at a large children's hospital this disease arrests without surgical intervention, and to discover something about the physical and mental state of the survivors.

Material

The series comprises children, under the age of 13 years, seen by Mr. Wylie McKissock between January, 1938, and December, 1957, at the Atkinson Morley Hospital, Wimbledon, and The Hospital for Sick Children, Great Ormond Street, and consists of all those who had no operation. Unconvinced as to the merits of any form of surgery, Mr. McKissock operated on these patients very rarely. Some were operated on by his surgical assistants, and a very few sought operation in other hospitals. Altogether 57 patients with different types of hydrocephalus and not selected on any particular basis received a variety of surgical procedures for their condition during the twenty years.

The remaining 182 patients in this series may, therefore, be considered representative of the hydrocephalic children seen by this neurosurgeon. The causes of hydrocephalus were:

	No. of cases
Malformation	43
"Trauma"	59
Infection	42
Tumour	4
Unknown	34

In most cases the hydrocephalus was acquired, either through infection or, more commonly, perinatal trauma or anoxia. Often the hydrocephalus began insidiously without any history to suggest its cause. It is likely that most of these, too, were due to a missed mild meningitis or to perinatal injury. The 4 tumour cases included had been thought to be "congenital hydrocephalus", but were unexpectedly found at necropsy to be posterior-fossa tumours.

Methods

After close scrutiny of the records and other available documents it was possible to trace all but 3 of the patients with the help of various authorities. Those surviving were re-examined, and Mr. Stephen Coates carried out intelligence tests on those over 18 months of age. Children too handicapped to be brought to Great Ormond Street or living abroad were examined locally, and intelligence tests were carried out by educational psychologists.

	No. of cases
Intelligence tested at The Hospital for Sick Children	46 (57%)
Intelligence tested elsewhere	16 (20%)
Estimate only	19 (23%)

Most of the grossly retarded children had only intelligence assessments made, often locally, since full intelligence tests were not considered justifiable in these patients. In fatal cases a strenuous effort was made to ascertain the precise cause of death, and, wherever possible, the clinical records of the terminal illness were scrutinised. The preserved central nervous system or histological material was examined, or, failing that, copies of the post-mortem reports or death certificates were obtained.

Course of the Disease

The disease usually began, as judged by progressive head enlargement, raised intracranial tension, and often depression of the optical axes, in the first six months of life (fig. 1). In the few children where the hydrocephalus began later, this generally followed a meningitis. The duration of the illness varied considerably, and in most cases lasted from three months to two years (fig. 2). There were, however, a number of children in whom the disease remained slowly progressive for years; although a proportion of these survived, their mental and physical condition tended to be rather poor.

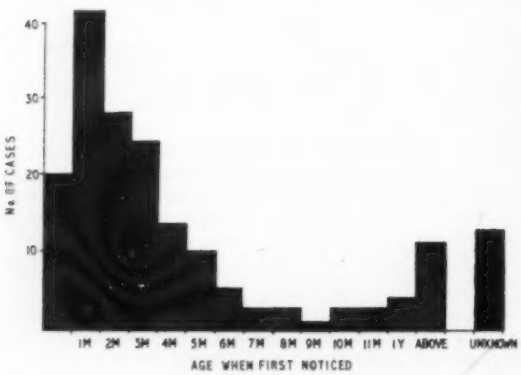

Fig. 1—Age of onset of hydrocephalus in 182 cases.

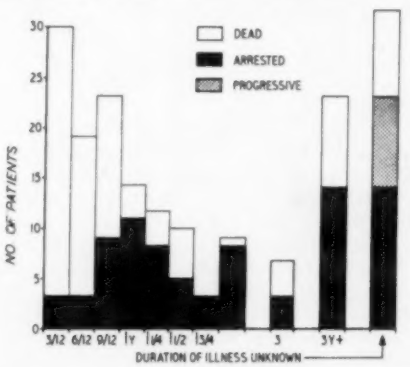

Fig. 2—Duration of illness in 182 cases from age of onset to natural arrest. The "unknowns" form a large group and include those in whom the disease is still active.

It is difficult to judge the exact moment of natural arrest of hydrocephalus. By observing together such clinical features as arrest of skull enlargement, return of the optical axes to normal, reduction in fontanelle tension, and a striking improvement in physical and mental development, a reasonable estimate of the time can be made. In most of the children in whom arrest took place this occurred between the age of nine months and two years (fig. 3).

Most children who died with this disease did so within the first eighteen months of life (fig. 4). The cause of death in a large proportion of these was cardiorespiratory arrest due to a progressive medullary failure, following progressive head enlargement and gradual deterioration—in other words, "hydrocephalus". Intracranial infection, in most cases, secondary to a spina bifida cystica, and terminal chest infection

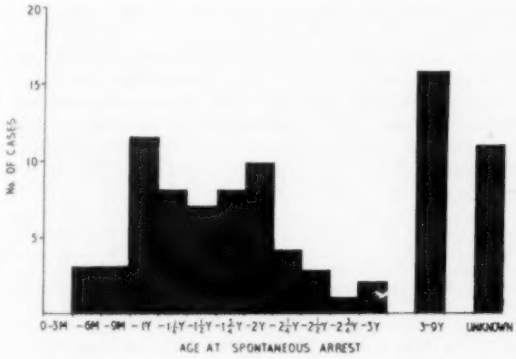

Fig. 3—Age of natural arrest in 88 cases (including 3 not traced and 4 who died of " unrelated causes ").

were other important causes of death. The causes of death in 89 cases were:

Cause of death	*No. of cases*
Hydrocephalus	42
Intracranial infection	13
Other related:	
Chest infection	16
Intraventricular hæmorrhage	2
Tumour extension	3
Following investigation	8
	29
Unrelated	2
Unknown	3

Results

81 of the children are alive and well with the hydrocephalus spontaneously arrested. A further 3 were not traced, but evidence suggests that these are alive with the disease arrested.

	No. of cases	
Alive:		
Hydrocephalus arrested	81	(46·2%)
Untraced (presumed alive)	3	
Still progressive	9	
Dead	89	(48·8%)

In 9 cases, all aged below 5 years, the condition is still progressive, and the remaining 89 patients have died. In almost half the children (47%) the disease has arrested spontaneously.

The intellectual performance of the survivors with arrest and their physical condition are of greatest importance, for upon these factors depends their future place in the community.

INTELLIGENCE ASSESSMENTS

Sources

It was possible to obtain intelligence assessments of all the 81 patients with arrested hydrocephalus. More than three-quarters of these were obtained from intelligence tests carried out either by Mr. Coates at The Hospital for Sick Children, or by psychologists elsewhere. Intelligence assessments on the remainder were made by hospital consultants conversant with the problem.

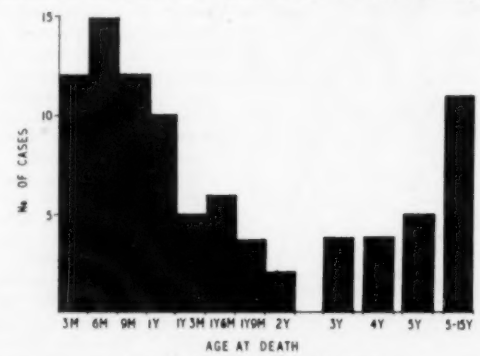

Fig. 4—Age at death in 89 cases.

Results

The average intelligence quotient of the whole sample was 69·7. The distribution was approximately normal, but with a large standard deviation of 30·33 (twice the normal). Fig. 5 shows the distribution compared with the normal distribution of the same number of cases.

	No. of cases	
Normal intelligence (I.Q. >85)	33 (41%)	59 (73%)
Below normal intelligence, but educable (I.Q. 50–84)	26 (32%)	
Ineducable (I.Q. <50)	22 (27%)	

If, however, the 17 cases with intelligence quotients below 40, the most severe cases, are excluded, the remaining 79% of the sample have a mean I.Q. of 84. This is approaching the normal intelligence range.

It will be seen that 73% of the cases are educable though subnormal in the sense that they have intelligence quotients of above 50. Using the Shernell reading test, reading ages were obtained on 21 of these 59 educable children (23 not having yet reached school age). Their

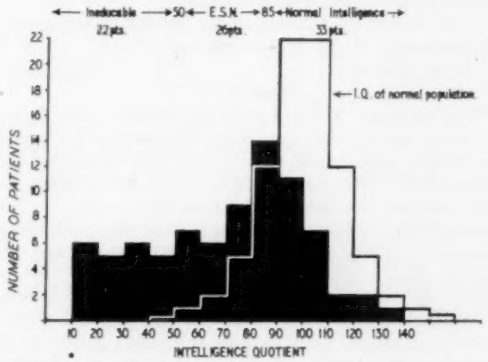

Fig. 5—Distribution of intelligence-assessment results in 81 cases (average I.Q. 69·7). The superimposed line represents the distribution of the same number of test results in a normal population.

average chronological age was 11 years 5 months, and their average reading age was 9 years 10 months, from which it would appear that they are not only educable, but have also been educated.

PHYSICAL HANDICAP

Many of the children suffer physical handicap in addition to mental impairment. Those with spina bifida cystica are, of course, often severely paralysed, especially in the legs and sphincters. The others, however, may have spasticity, joint contractures, incoordination or impaired vision among others. An attempt was made to grade the degree of handicap, and it was found that 27 (33%) of the 81 children with arrested hydrocephalus had very little or no physical disability. These children were by no means always those with the less severe head enlargement or thinning of the " cortex ". The remainder were impaired to varying degrees ranging from a squint that interfered with reading, or slight imbalance, to being totally bedridden.

RELATIONSHIP OF INTELLIGENCE TO OTHER FEATURES

(1) No relationship between the intelligence quotient and the size of the head was found.

(2) In 37 cases where reliable information on the thickness of the pallium was available, estimated either by ventricular

puncture or from air encephalography, it was found that the thickness of the pallium was not related to intelligence. As examples, a child with cortical thickness of 0·5 cm. estimated from a ventriculogram, had an I.Q. of 85, and another of 100.

(3) No significant relationship was found between the intelligence quotient and the length of time that the hydrocephalus had been progressive.

(4) A small correlation (significant at the 5% but not at the 1% level) existed between the intelligence quotient and age, the scores tending to rise slightly with age, presumably because a child overcomes some of his physical handicaps, and is therefore able to have more intelligence available for measurement by the tests employed.

(5) A high correlation (0·77) was found between intelligence quotient and the degree of physical handicap; those with least handicap scoring higher. This relationship will be partly caused by the failure of tests to measure the remaining ability.

It seems that should a hydrocephalic child survive to arrest spontaneously, he has a 75% chance of being educable, and a 57% chance of being taught, apart from his physical handicap, in a school for normal children. In fact, of the 81 cases with arrested hydrocephalus which were traced, 25 are children of normal intelligence with negligible or no physical handicap.

A more detailed analysis of the results, together with the prognosis of the various ætiological groups, will be published elsewhere.

Discussion

It is generally believed that few children with hydrocephalus survive, and that those who do are doomed to permanent institutional care. Ford (1952) agrees that in some children the disease seems to become arrested, but adds that in such cases the child may go through life with more or less mental defect, optic atrophy, and spastic paralysis. Holt and McIntosh (1953) state that congenital hydrocephalus may become arrested at any stage, but maintain that such an outcome is rare. Clinicians who commonly deal with this problem are well aware that natural arrest is quite common. Ingraham and Matson (1954) briefly refer to it but make no mention of its incidence, and Jolly (1955) discusses only its importance. On the other hand Macnab (1955) reports 19 cases with spontaneous remission among his 160 patients. Forrest, Laurence, and Macnab (1957), when following up their patients seen between 1954 and 1955, found that 30 of their 70 cases had arrested spontaneously, but no reference was made to their physical or mental condition.

It may be thought that the high rate of arrest is based on an unrepresentative series of less severe cases, the more progressive being selected for operation. This in fact is not so, since those patients receiving surgical treatment tended to have less advanced hydrocephalus. It should be re-emphasised, however, that this is a series based on the neurosurgical practice of a large children's hospital and that it is not entirely representative of the worst cases of hydrocephalus, which are fatal in the first three months, nor of the mildest forms of hydrocephalus.

This investigation suggests a more hopeful prognosis, for an appreciable number of these cases have not only survived but are now growing into useful citizens capable of earning their living. Further, in view of the 46% spontaneous-arrest rate, the reported results of surgery in hydrocephalus may have to be reassessed.

Summary

182 unselected and unoperated cases of hydrocephalus seen by one surgeon during the past twenty years have been followed up. Of these, 89 have died, 81 have arrested spontaneously, 9 remain progressive, and 3 have not been traced, but are probably alive. Of the traced survivors with spontaneous arrest, 75% are educable, and the intelligence quotient of 57% falls within the normal range (I.Q. 85 and above). The relationship between intelligence and other features (head size, cortical thickness, and physical condition and age) is briefly discussed. The prognosis and the results of surgery in this condition may have to be reconsidered.

I am greatly indebted to Mr. Wylie McKissock for permission to use his cases, to Mr. Stephen Coates for his part in this investigation, and to Prof. A. A. Moncrieff and Dr. M. Bodian for advice and criticism. My thanks are also due to Miss K. M. Hare, Miss J. C. Marson, and Miss M. Crawford for help in finding the case-records; to Miss M-L. Lépine for invaluable secretarial assistance; to Mr. G. Lyth for the charts; and to the research committee of The Hospital for Sick Children, Great Ormond Street for encouragement and financial support.

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A SIMPLE BIOLOGICAL TEST FOR CATECHOL-AMINES IN URINE

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With the technical assistance of A. R. REYNAUD

von Euler and Hellner (1951) described a biological method for estimating catechol-amines in the urine. After adsorption on alumina the catechol-amines are eluted and assayed in a cat. Hamilton et al. (1953) described a similar method in which the assay was carried out in the rat.

A more rapid approximate estimation of urinary catechol-amines can be made by measuring the rise in blood-pressure after direct intravenous injection of urine into an anæsthetised rat. This method is simple, requires little apparatus, and has proved suitable for screening large numbers of patients with hypertension to exclude phæochromocytoma. Since we began using this technique over a year ago, Masson et al. (1957) have described a similar method.

Method

A Wistar albino rat (about 250 g.) is anæsthetised by intraperitoneal injection of 0·15 ml. of 50% solution of urethane; simultaneously two separate subcutaneous injections of 0·2 ml. are given to maintain anæsthesia for several hours. A simple manometer is made by filling a 'Polythene' tube (external diameter 1 mm., internal diameter 0·5 mm.) with heparinised saline (50 units per ml.) and drawing mercury (about 20 cm. column) into one end (see figure). The part of the tube containing the mercury

is bent to form a U and mounted vertically on the scale; the other end is inserted into the rat's carotid artery. Injections are made with a 1 ml. graduated tuberculin syringe through a 16-gauge needle connected to a short polythene cannula placed in the external jugular vein. After injection of 0·2 ml. of heparinised saline, 0·5% solution of pentolinium tartrate ('Ansolysen') is infused slowly until there is no further fall in blood-pressure. Usually 0·2 to 0·3 ml. is required and reduces the blood-pressure to 50 or 60 mm. Hg. A standard solution containing 0·1 μg. of noradrenaline per ml. is prepared by diluting noradrenaline ('Levophed') 1 in 10,000 in normal saline. 0·1 ml. of this solution gives a sharp but transient rise of blood-pressure varying from 5 to 20 mm. Hg in different rats; in the same animal the rise following repeated injections is fairly constant over a period of ½–1 hour.

Urine, acidified by adding 1 to 2 ml. concentrated HCl per 100 ml. urine, can be kept for several days in a refrigerator (2° C). Just before use solid sodium bicarbonate is added in amounts sufficient to bring the pH to between 6 and 7 (tested by 'Universal' indicator paper). The urine is then infused cautiously into the external jugular vein of the test animal; if there is no sharp pressor response an injection of 0·1 ml. is made. If this causes a significant rise in blood-pressure (more than half that following 0·1 ml. of noradrenaline solution) a rough assay is made by finding the amount of noradrenaline solution needed to give the same rise as a known amount of urine (usually 0·1 ml.). Urine which has a marked pressor effect is suitably diluted in normal saline before making the assay. Evidence that the pressor substance is noradrenaline or adrenaline is obtained by injecting 0·1 ml. of 0·05% phentolamine ('Rogitine' diluted 1 in 10 in saline) into the rat; this inhibits the pressor effect of subsequent injections of urine containing catechol-amines.

Up to 15 samples can be tested in the same rat (before phentolamine is given) provided that responsiveness is maintained; this is tested by injection of noradrenaline solution after each urine sample. If the response to noradrenaline is small, larger injections of urine (up to 0·4 ml.) are required so that a smaller number of samples can be tested.

Results

The results of the assay of 24-hour samples of urine from six patients suffering from phæochromocytoma are given in the table and are compared with the results obtained from the same samples of urine by a chemical method (Wright 1958). The diagnosis was confirmed at operation in all patients.

We have examined 24-hour samples of urine in 59 other patients suffering from severe hypertension or with symptoms suggestive of phæochromocytoma; in all but 2 the daily excretion was less than 100 μg. noradrenaline per day. One patient excreted 140 μg. and another 250 μg. but there was no clinical evidence of phæochromocytoma; repeated examination showed no excess of noradrenaline in subsequent urine samples.

We have also examined "casual" specimens of urine from over 100 outpatients suffering from different forms of hypertension. Concentrations of noradrenaline of 0·1 μg. per ml. were found in 2 samples, but at subsequent examination urine from these patients was normal. No other sample gave a significant pressor response.

24-HOUR EXCRETION OF PRESSOR AMINES ESTIMATED BY BIOASSAY COMPARED WITH RESULTS OF CHEMICAL METHOD ON SAME SAMPLE

Patient	Present bioassay nor-adrenaline equivalent (μg.)	Wright (1958)	
		Noradrenaline (μg.)	Adrenaline (μg.)
1	4500	2800	615
2	400*	2740	77
3	500	935	360
4	600	434	127
5	1200	1302	245
6†	1100	753	173

* This specimen had been kept for several months between chemical and bioassay.

†I am grateful to Dr. A. L. Jacobs, of the Whittington Hospital, for letting me have the urine from one of his patients.

Discussion

It is not claimed that this is an accurate method of assay; it is, on the other hand, a quick method for screening using simple apparatus and needing little technical skill.

The assay results are expressed as noradrenaline. Added adrenaline does not increase the pressor effect of noradrenaline when the two are injected together into the rat so that this method probably measures noradrenaline only and may give a low result for total catechol-amines in patients excreting a high proportion of adrenaline.

In all 6 patients with proven phæochromocytoma the pressor effects of the urine on the rat left no doubt about the diagnosis, whereas in very few instances did urine from the hypertensive patients give a measurable pressor response. There may very occasionally be some doubt in differentiating the latter from cases of phæochromocytoma in whom the excretion is low, but in the great majority the separation is easy and reliable.

I am grateful to Professor Clifford Wilson for his help in the preparation of this paper.

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A RAPID QUANTITATIVE METHOD FOR CHEMICAL ESTIMATION OF URINARY CATECHOL-AMINES IN THE DIAGNOSIS OF PHÆOCHROMOCYTOMA

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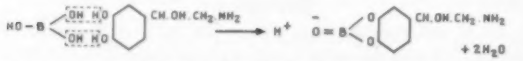
THE usual method for the extraction and preliminary purification of urinary catechols is to adsorb them with alumina (von Euler and Hellner 1951, Lund 1949, Pekharinen and Pitkanen 1955). The main disadvantage of this method is that alumina is difficult to standardise, and no two batches can be relied upon to give the same performance. Moreover, adsorption of catechol-amines on to alumina requires careful manipulation at pH levels which are unfavourable to their stability.

The synthetic inorganic material 'Permutit' was first used by Whitehorn (1923) to extract adrenaline from solution, and more recently Bergström and Hansson (1951) and Hellberg (1955) have used the carboxylic cation-exchange resin, 'Amberlite' IRC 50, for the same purpose. Weil-Malherbe and Bone (1957) and Burn and Field (1956) use cation-exchange resins as a subsidiary means of purifying catechol-amines after preliminary extraction from urine with alumina columns.

In the work recorded here I am indebted to Prof. C. J. O. R. Morris for suggesting that catechol-amines could be extracted from solution as boric-acid complexes by means of anion-exchange resins. This has provided a method for extraction and estimation of these substances which can be carried out rapidly by a skilled technician and which gives a degree of accuracy comparable to existing but more complicated methods.

Principle

Acidified urine is passed through an anion-exchange column in the acetate form, the effluent being free of strong organic and mineral acids. Boric acid is added to form strongly acidic complexes with the catechols present in solution:



Passage of this solution through an anion-exchange resin in the borate form results in retention by the resin of the catechol complex. The complex is eluted by dilute mineral acid and the catechols estimated fluorimetrically.

Materials and Method

Chemicals: HCl, CH_3COOH, HCOOH, NaOH, $NaHCO_3$, K_3FeCN_6, Na_2CO_3, $ZnSO_4$ ('Analar'). Potassium tetraborate (laboratory reagent). Ascorbic acid. Adrenaline bitartrate. Noradrenaline bitartrate.

Resin: 'Dowex' 2 anion-exchange resin. 120–150 mesh.

Apparatus: Glass columns about 10 cm. long, internal diameter 0·5 cm. Reservoir to hold about 40 ml. Stoppered glass fluorimetry tubes approx. 20 ml. capacity, marked at 10 ml. level. The fluorimeter was constructed in this laboratory by Dr. E. R. Holiday and Dr. J. R. K. Preedy and was used by Aitken and Preedy (1956) for the estimation of urinary œstrogens.

Method

Urine is collected over 24-hour periods, each individual specimen being acidified with concentrated HCl in the proportion 1 ml. acid to 100 ml. urine, the specimens being bulked after acidification.

Columns of dowex 2 about 8 cm. are prepared by slurrying about 2 g. of the resin in water. The acetate form is prepared from the chloride form by cycling through a carbonate phase using 2 *N* solutions of sodium carbonate and acetic acid respectively. Before use the column is washed with distilled water until free from acid. A similar column containing the resin in the borate phase is prepared directly from the chloride phase by washing with 0·5 *M* potassium tetraborate solution until the effluent is chloride-free. The column is washed with dilute boric-acid solution (0·004 *M*) until the effluent is neutral to litmus. It is convenient to indicate the presence of borate on this column by adding one drop of 1% phenolphthalein solution to the aqueous suspension of the resin before it is slurried into the column.

When the resin is in the borate form it turns a bright mauve colour. This colour fades from above downwards when solutions which displace borate are passed through the column, and disappears altogether if the column is overloaded or during elution with acid. The colour reappears on regeneration of the column and there is no need to make any further addition. Phenolphthalein appears to be firmly bound to the resin, and it has been shown that it does not interfere with the fluorescence reaction described below. 5 ml. aliquots of filtered acidified unhydrolysed urine are used in the columns.

The urine is poured into the column of dowex-2 acetate and allowed to percolate at the rate of about 1 ml. per minute. The column is then washed with 10 ml. of boiled distilled water, the urine filtrate and washings being combined. The pH of this mixture should be in the region of 5·0. Boiled water is used in order to minimise displacement of borate by carbonate ions in the next stage of the procedure. Similarly the potassium tetraborate solutions used for regeneration are also made up in freshly boiled distilled water, otherwise retention of carbonate ions by the column leads to troublesome effervescence during elution with acid.

1·0 ml. 0·1 *M* boric-acid solution is mixed with the filtrate and washings from the first column and the mixture allowed to pass through the second column (in the borate phase) at the rate of 1 ml. per minute. The column is then washed once with 10 ml. 0·004 *M* boric-acid solution and eluted with 25 ml. 0·2 *N* HCl.

5 ml. aliquots of the eluate are placed in each of three fluorimeter tubes. The pH of the samples is now adjusted for differential oxidation of adrenaline and noradrenaline by the method of von Euler and Floding (1955a and b). The pH of the eluate will depend on the amount of borate and acetate in the eluate. This in turn depends upon the ionic strength of the original urine specimen. Usually the pH will be below 3. In this case formate buffer of pH 4·2 (equal volumes of *N* formic acid and *N* NaOH) is added dropwise to one of the tubes until the pH is 3. 0·5 *N* $NaHCO_3$ is added dropwise to the other two tubes until the pH is stable in the region 6–7. Where the pH of the eluate is above 3 the adjustment to pH 3 in the first tube is made by dropwise addition of 0·2 *N* HCl. 0·1 ml. 0·5% $ZnSO_4$ solution is added to the first tube (pH3) only, to facilitate the oxidation of adrenaline. 0·1 ml. 0·25% potassium-ferricyanide solution is added to each tube, the contents of which are mixed well. After 3 minutes, oxidation is stopped by adding to the first tube 1 ml. of a solution containing 1 ml. 2% freshly prepared ascorbic acid in 9 ml. 20% NaOH and the mixture is made up to the 10 ml. mark with distilled water. 2 minutes are allowed for oxidation of the catechol-amines in the other two tubes, in which the pH had been adjusted to 6–7. After this time, 1 ml. of the ascorbic-acid NaOH solution is added to one of these tubes, and to the other 1 ml. of a solution containing 1 ml. of water in 9 ml. 20% NaOH; both are then made up to the 10 ml. mark. The tubes receiving ascorbic-acid solution are immediately ready for fluorimetric study, but the control tube requires about 5 minutes for the fluorescent product to fade.

Standards comprising 2 μg. noradrenaline and 1 μg. adrenaline respectively in 5 ml. 0·2 *N* HCl adjusted to appropriate pH are taken through the same procedure. The fluorimeter is provided with a blue primary filter (Chance OB 10) and a yellow secondary filter (Chance O Y 4). With the zero reading corresponding to a tube filled with plain water and the 20·0 mark to a tube containing standard quinine-sulphate solution (1 mg. quinine sulphate. $2H_2O$ in 100 ml. 0·1 *N* H_2SO_4), 2 μg. noradrenaline gives a galvanometer deflection of about 12·0 divisions and 1 μg. adrenaline a deflection of 16·5.

Most normal urines contain minute amounts of noradrenaline and even less adrenaline, and give a very low fluorimeter reading. The blank value varies between 0·8 and 4·0 and the difference between this and the other two tubes is often negligible; in screening cases for the presence of phæochromocytoma an excess of catechol-amines is thus immediately evident. Caution is necessary, however, if the original 24-hour volume of urine is large, as an excess of catechol-amines may be masked by dilution.

According to von Euler and Floding (1955a), all the adrenaline and noradrenaline in the sample is oxidised by the above process at pH 6, and whereas the adrenaline is still oxidised at pH 3 in the presence of zinc sulphate, noradrenaline is for practical purposes stable at this pH.

In the present system these assumptions are sometimes valid but frequently a considerable proportion of noradrenaline is also oxidised at pH 3. The extent to which oxidation of noradrenaline occurs at pH 3 varies with different urine extracts from 5% to 30%.

Where accurate results are required a correction can be made by running a sample of the same urine containing a known quantity of added noradrenaline through a separate column. Comparison of readings after oxidation at pH 6 and pH 3 on the eluates from the two columns gives an estimate of the proportion of added noradrenaline oxidised at pH 3 and also an estimate of the recovery of noradrenaline.

In practice, when dealing with samples of urine known to contain an excess of catechol-amines four samples of urine are run simultaneously through four similar columns. One sample contains an additional 10 μg. noradrenaline, another 5 μg. adrenaline, while no catechol-amine is added to the other two. The two blank specimens provide an internal check on the reliability of the method. In 18 different urines where the full procedure described here was carried out the average difference from the mean readings for two samples of the same urine passed through different columns was 6·8% for fluorescence attributable to noradrenaline (reading obtained after oxidation at pH 6 minus reading obtained after oxidation at pH 3) and 8·4% for fluorescence attributable to adrenaline (reading obtained after oxidation at pH 3 minus reading obtained after oxidation at pH 6 without subsequent addition of ascorbic acid). The recovery of added noradrenaline in these cases was 60% ± 11% (S.D.) and of adrenaline 64% ± 6% (S.D.).

Using four columns it is possible to screen four unknown urines for the presence of excess catechol-amines or to get an accurate estimate of the catechol-amine content of one urine sample in about two hours. More than four columns could be used at one time without materially increasing the total length of the procedure.

Estimation of 5-hydroxytyramine can be quite simply carried out on the remaining 10 ml. of acid eluate, using the condensation reaction with ethylenediamine described by Weil-Malherbe

and Bone (1952). This estimation has not, however, been performed routinely because the significance of the result is obscure and the presence of high levels of 5-hydroxytyramine does not necessarily correlate with the presence of a phæochromocytoma.

Results

Urine samples from 69 hypertensive patients, in most of whom there were some clinical grounds for suspecting the presence of a phæochromocytoma, have been examined by the above method. In several cases multiple samples were tested. High urinary catechol-amines indicating the presence of phæochromocytoma were found in 6 cases, the diagnosis being confirmed at operation in each case. The clinical features and operative findings will be described in detail elsewhere. Catechol-amine estimations were performed on many samples of urine from each of these patients, and the results in representative samples are given below.

Duplicate estimations on some specimens were made by Dr. Weil-Malherbe by his chemical method (Weil-Malherbe and Bone 1957) and by Dr. M. A. Floyer using a pressor test in the rat (Floyer 1958). The results showed general agreement.

Case no.	24-hour catechol-amine excretion (μg.) Noradrenaline	Adrenaline
1	2800	615
2	2740	79
3	935	360
4	434	127
5	1302	345
6	753	173

In the remaining 63 cases, the 24-hour total of catechol-amines estimated as noradrenaline (i.e., calculating fluorescence due to adrenaline in terms of noradrenaline) has not exceeded 200 μg., except in 1 case mentioned below. Where the results have been worked out separately for adrenaline and noradrenaline the total for noradrenaline has not exceeded 150 μg. in 24 hours. These results are in accordance with most published work to date. Adrenaline values were generally below 50 μg. per 24 hours, but in two specimens from a patient in another hospital the values were 272 and 495 μg. respectively, the corresponding figures for noradrenaline being 19 and 71 μg. As there has not been any opportunity for follow-up, the significance of these findings is obscure. Phæochromocytoma with high adrenaline excretion is well accredited, and indeed 3 of the cases listed above show excretion levels of comparable degree, but an associated excessive excretion of noradrenaline is usual.

Summary

A new method for the extraction of catechol-amines is described. Catechols form strongly acidic complexes with borate ions and can be extracted from solution with basic resins. The method is simple, quick, and economical to operate. The results in 69 patients with hypertension are reported. 6 of these had high values and the diagnosis of phæochromocytoma was confirmed at operation.

This work was carried out in the London Hospital Medical Unit laboratories and I am grateful to Miss I. Lauchlan for technical assistance and to Prof. Clifford Wilson and Prof. Colin Morris for their interest and encouragement in this work.

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THE LATEX FIXATION TEST IN RHEUMATOID ARTHRITIS

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RHEUMATOID arthritis is now generally regarded as a systemic disease not confined to the joints, and the presence of abnormal globulins is, it has been suggested, a significant pathological change. It is therefore of interest that the most specific serological test for rheumatoid arthritis, the Waaler-Rose test, appears to be based on the presence of an antibody to non-specific groups of γ-globulin (Glynn et al. 1957). This hypothesis makes it possible to simplify the Waaler-Rose test considerably, because no differential agglutination is necessary and a large variety of globulins, modified by adsorption on small particles, can be used as antigen.

The latex fixation test of Singer and Plotz (1956) is based on this principle. The detector system used is a suspension of polystyrene latex particles coated with human γ-globulin. These particles are agglutinated by sera of patients suffering from rheumatoid arthritis after incubation at a temperature of 56°C for 1–2 hours in dilutions of 1 in 20 or more. The technique of the test is described below. We have doubled the strength of the suspension of coated latex particles, since we found this gave better results.

Materials

Stock suspension of latex particles.—2 ml. of an 11% suspension * of polystyrene latex particles of 0·81 μ diameter is added to 20 ml. of distilled water and filtered through Whatman no. 40 filterpaper. The resulting density is adjusted so that if 0·1 ml. of stock is added to 10 ml. of buffer (see below) the resultant suspension gives a light transmission of 6% in a 1 cm. cell in a spectrophotometer at 650 mμ. The stock suspension will keep in the refrigerator for several months.

Borate-saline buffer pH 8·2.—50 ml. of 0·1 *M* boric acid and 5·9 ml. of 0·1 *N* sodium hydroxide are made up to 100 ml. with distilled water and the pH adjusted to 8·2. 0·85 g. of sodium chloride is added to 100 ml. of buffer.

Stock γ-globulin.—Human γ-globulin, either dried or liquid, is dissolved in borate-saline buffer to give a dilution of 5 mg. in 1 ml. This solution will keep in the refrigerator for several weeks.

Methods

The sera to be tested are diluted serially from 1/20 to 1/320 or higher with borate-saline buffer, leaving 1 ml. in each tube.

Prepare a mixture of 0·2 ml. stock latex suspension, 1 ml. of stock 0·5% γ-globulin, and 8·8 ml. borate-saline buffer. 1 ml. of this mixture is added to each tube. Two control tubes are set up containing a known positive and a known negative serum in a dilution of 1/20.

The tubes are shaken to mix and incubated at 56°C for 1 hour: cooled in a refrigerator and centrifuged at 3000 r.p.m. for 3 minutes. Agglutination at 1/20 is taken as positive, and most positive sera have titres well above this figure. A single-tube screening test using a 1/20 dilution only may be used if large numbers of tests have to be done.

Results

We have compared this test with the Waaler-Rose test using the modification of Heller et al. (1949) in 130 sera and found almost complete agreement (table I). The sera were classified according to clinical diagnosis. The "non-rheumatic" diseases were sera sent for routine Wassermann tests, including antenatal cases, and it is noteworthy that no false positive results were obtained. Of the 9 negative sera from rheumatoid-arthritis cases,

* Dow Chemical Co., Midland, Michigan, U.S.A.

TABLE I—COMPARISON OF LATEX FIXATION AND WAALER-ROSE TEST

Diagnosis	Latex fixation test		Waaler-Rose test	
	Positive	Negative	Positive	Negative
Rheumatoid arthritis	37	9	39	7
Osteoarthritis	0	12	0	12
Ankylosing spondylitis	0	2	0	2
Systemic lupus erythematosus	1	0	1	0
Rheumatic fever	0	6	0	6
"Arthritis"	0	21	0	21
Fibrositis	0	6	0	6
Reiter's disease	0	1	0	1
Non-rheumatic diseases	0	35	0	35
Total	38	92	40	90

Positive L.F.T. = titre of 1/20 or over.
Positive W.R.T. = differential titre of 1/16 or over.

6 were very early cases with a doubtful clinical diagnosis. Of these 1 gave a weakly positive Waaler-Rose test. The other 3 were improving under cortisone treatment, and again, 1 gave a positive Waaler-Rose test.

The difficulty of obtaining human γ-globulin led us to look for a substitute, and bovine γ-globulin fraction II (Armour) was found to be satisfactory. The suspension was prepared by adding 0·2 ml. stock latex suspension and 1·0 ml. of 1% bovine globulin to 8·8 ml. of borate buffer. This higher concentration of bovine globulin was found to give the best results. After incubation at 56° C for 1 hour the tubes were left at room temperature for 24 hours instead of centrifuging, since this was thought to be less laborious and the results were easier to read.

A small series of sera were run in parallel using human and bovine globulin and showed complete agreement (table II).

We have found the latex fixation test as sensitive and specific as the Waaler-Rose test, and much less time-consuming for the laboratory. The possibility of using bovine globulin seems to confirm the suggestion of Glynn et al. (1957) that the serum of rheumatoid arthritics contains an antibody to non-specific groupings of γ-globulin of many species, and bovine globulin acts as well as human, rabbit, guineapig, and horse γ-globulin previously used.

TABLE II—COMPARISON OF LATEX FIXATION TESTS WITH HUMAN AND WITH BOVINE GLOBULIN

—	Human globulin test		Bovine globulin test	
	Positive	Negative	Positive	Negative
Rheumatoid arthritis	26	4	26	4
Non-rheumatic diseases	0	30	0	30
Total	26	34	26	34

Summary

The latex fixation test of Singer and Plotz and a modification using bovine γ-globulin are described. Both tests were found to be as sensitive and specific as the Waaler-Rose test.

We have to thank the Dow Chemical Co. Midland, Michigan, for the supply of the polystyrene-latex-particle suspension, and Dr. J. Shafar and Mr. D. A. Richmond for sending us sera from their patients.

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Addendum

Since writing this article a slight modification has been published [1] which we have found to be an improvement. The borate buffer is replaced by a glycine buffer prepared by adding to 0·1 *M* glycine, enough *N* NaOH to bring the pH to 8·2. To each litre of buffer add 10 g. NaCl.

We have also tried a rapid slide modification of the latex fixation test which works very well. The reagent is prepared by adding to 0·2 ml. latex suspension (light transmission 6%) 1 ml. 1% bovine γ-globulin solution. The test serum, a positive and a negative control serum is diluted 1 in 20 in glycine buffer and 1 drop of each is mixed with 1 drop of reagent on a slide. If the test is positive, clearly visible clumps can be seen in a few minutes.

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Preliminary Communication

RELATIVE STABILITY OF BRAIN LIPIDS

THE classical metabolic studies of Schoenheimer and others, and their enunciation of the concept of the dynamic state of body constituents,[1] provided an attractive framework for new hypotheses concerning some hitherto obscure tissue degenerations. In few fields have these physiological "turnover-rates" been studied more fully than in brain metabolism, in the hope that such investigations might throw light on the demyelinating diseases. Unfortunately, the use of radioisotopes has led to a mass of conflicting evidence [2–4] concerning the permanence or otherwise of myelin lipids in nerve-sheaths, much of it rendered ambiguous by suppositions as to the alleged (but by no means substantiated) interposition of a "blood-brain barrier".[5]

The cholesterol of the central nervous system has generally been assumed to be relatively inert metabolically, but investigations on the question have been handicapped by the apparent difficulty with which the brains of adult animals incorporate parenterally injected labelled cholesterol. It has recently been shown, however, that in developing animals during the period of myelination, the brain can readily take up ^{14}C-cholesterol, and that when this substance is injected into newly hatched chicks [6] and young rabbits,[7] it enters the central nervous

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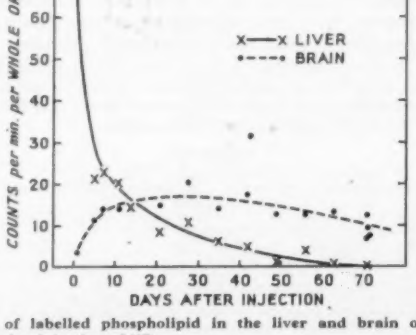

Levels of labelled phospholipid in the liver and brain of rats following injection of ^{32}P.

system and persists there with little alteration for at least 12 months.

Current views on the metabolism of brain phospholipids,[8] some of which also form important constituents of myelin sheaths, are that these substances vary somewhat in their turnover-rates, but in general that they are rapidly exchanged and renewed. Such rates, however, have generally been calculated from studies on the rates of uptake of ^{32}P in experiments, either in vitro or in vivo, that have only lasted for a few hours. The assumption has been made that the rate of incorporation is balanced by a similar rate of loss—an assumption which could well be misleading if applied to substances that are taken up during the course of development by structural elements that persist into adult life.

Preliminary experiments recorded here show that in young rats the levels of radioactive phosphorus, once incorporated into brain phospholipids, fall very slowly indeed. A measurable level of labelled phospholipids persists in the central nervous system after the label has disappeared from these lipids in blood and other organs, and shows only a small decline even as long as ten weeks after the radioactive phosphorus has been administered.

METHODS AND RESULTS

Fourteen rats from two litters, 16 days old, with an average weight of 30–35 g., each received an intraperitoneal injection of 25 μc. ^{32}P as phosphate. Animals were killed at intervals, and the blood, brain, and other organs extracted with twenty times their volume of chloroform/methanol (2 : 1 v/v). Radioactivity was determined in a type M6 liquid beta-counter.

Results have been expressed in terms of counts per minute per whole organ and are set out in the accompanying figure.

It therefore appears that in the brain, compartments exist for phospholipids as well as for cholesterol in which these substances are relatively inaccessible to the rest of the body metabolism. The more precise chemical nature of these phospholipids, as well as their anatomical site, are subjects of current investigation. If the belief that they are constituents of myelin is correct, a picture emerges of a nerve-sheath which is metabolically more stable than has generally been supposed.

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Reviews of Books

Viscount Addison: Leader of the Lords

B. J. MINNEY. London: Odhams. 1958. Pp. 256. 25*s*.

FEW medical men in Parliament have attained ministerial rank, and, of the few, Christopher Addison is incomparably outstanding. Mr. Minney gives us an interesting picture not only of Addison himself but also of the background of politics during the stormy years between the great Liberal victory in 1906 and the outbreak of war in 1914. Before 1914 Addison's most important achievement was the part he played in getting the National Health Insurance Bill through the House of Commons.

During the 1914–18 war Addison helped to organise the Ministry of Munitions, of which he later took charge; and in 1919 he became the first Minister of Health. Lloyd George's election campaign in 1918 included as a main feature (as well as "hang the Kaiser") "homes for heroes"; and it was for Addison, as Minister of Health, to fulfil this rash promise. Many supporters of the Coalition Government were soon attacking Addison bitterly for extravagance: "homes for heroes" should not be provided with baths and running water, they said, for the workers would only use baths for storing coal. In the end Lloyd George and Austen Chamberlain sacrificed Addison to appease the malcontents, and thereafter Addison joined the Labour Party.

Addison's most valuable work was perhaps his leadership of the Lords during the Labour Government of 1945. His tact and firmness did much to persuade the Tory majority in the Lords to pass most of the legislation sent up by the first Labour Government.

Most doctors who have been active politicians have not been prominent in their profession. This was not so with Addison. After qualifying at Barts he took up the study of anatomy, became a fellow of the Royal College of Surgeons, and was appointed professor of anatomy at Sheffield at the remarkably early age of 28. In 1901 he went to London and took charge of the teaching of anatomy at Charing Cross Hospital Medical School, of which he was also dean. There can be little doubt that had he remained in an academic post he would have become a leader in his subject and in medical education in its widest aspects.

Mr. Minney's book is in three parts: the first deals with the period from Addison's peerage in 1937 to the beginning of his last illness in 1951; the second is an account of his life and activities from early years to 1937; and a short concluding section describes his last illness. Readers might have been helped by a more orthodox form of biography, in which it would have been easier to see events in their chronological order. There is a tendency to give dates by day and month but not year; and the book might be improved by giving the year and Addison's age at the top of each page.

Dealing as it does with the most exciting and dangerous half-century so far in our history, the book will interest the general public as much as doctors. Even those who disagreed with Viscount Addison in his views and actions cannot fail to be attracted by the sincerity and high ideals here displayed.

A Primer of Cerebral Palsy

JOSEPH D. RUSS, M.D., assistant professor of pediatrics, Tulane University School of Medicine; HYMAN R. SOBOLOFF, M.D., assistant professor of orthopedics, Tulane University School of Medicine, and medical director, Louisiana State Cerebral Palsy Center. Springfield, Ill.: Charles C. Thomas. Oxford: Blackwell Scientific Publications. 1958. Pp. 77. 30*s*.

IN few words, as in any good monograph on a limited subject, the authors have conveyed many facts. The importance of teamwork is mentioned in the preface, and its usefulness in dealing with the many problems of this type of brain disorder is obvious throughout the text. The chapters are short but informative, with a nice balance between the medical and the orthopædic outlook. The illustrations are clear and helpful, whether the reader be lay or specialist. The bibliography is particularly useful in that it is divided between the medical and the surgical aspects, as well as being conveniently separated under the appropriate year.

Although this book can be described as a précis of the subject it may well serve as an introduction to further study, and it could safely be given to parents who wished to know something of the cause as well as the prognosis and necessary management of this enigma of child development.

Orthopædics in General Practice

W. H. GERVIS, M.A., M.B., F.R.C.S. London: Heinemann Medical Books. 1958. Pp. 120. 10*s*. 6*d*.

MOST patients attending orthopædic clinics do so with a complaint of backache or painful feet. A few require special investigation, such as radiography, and even fewer must have surgical treatment, expert physiotherapy, or the fitting of some appliance. The remainder need a clinical examination, a

diagnosis (the patient wants a name for his condition, and needs to know that it is not one hitherto unrecognised by medical science), and, most of all, reassurance.

In explaining how such cases can be managed by the family doctor, Mr. Gervis is able to draw on an unusual breadth of experience, because for several years he worked as a general practitioner, before specialising in orthopædic surgery. He points out that when a patient, with a pain in his back or limbs, asks his doctor "is it rheumatism?", the probability is that he is experiencing the results of either a bad posture or a normal ageing process. Many such pains stem from life in "a flexed and sedentary civilisation" and can be relieved by exercises which move the joints through their full, but unaccustomed, range. He has written a light-hearted, lucid book, containing a clear exposition of such complex problems as "flat feet". Many of his remarks upon such topics as shoe design, corsets, and the shape of car seats will bear a lot of repetition to a lot of patients.

The Surgeon's Tale

ROBERT G. RICHARDSON, B.M. London: Allen & Unwin. 1958. Pp. 256. 25*s*.

THERE is a fascination about the history of surgery during the past century of which authors and publishers never seem to tire. Hardly a month passes but one or two books appear, dealing with this theme in a popular style. Unfortunately the principal facts in this story have long been clearly set forth, and successive writers can do little save repeat them. The anæsthetic demonstration in the steeply tiered theatre of the Massachusetts General Hospital, Semmelweis at the Allgemeines Krankenhaus in Vienna, Lister meditating on the sewage plant at Carlisle; in listing and describing such events, all these volumes must perforce subscribe to a common pattern, and a casual inspection of Dr. Richardson's new book may suggest that it is no different.

In fact, its pages contain a very great deal of information not to be found in much larger histories, and which will be new even to many well-read doctors. How many, for instance, know that Billroth composed "a string quartet, a piano quintet and three trios"? Or that Courvoisier, having performed the first posterior gastro-enterostomy on record, then contributed to the patient's demise by taking her out, on the eighth postoperative day, in a carriage to a medical meeting? Perhaps the best indication of the unusual scope of *The Surgeon's Tale* is to be found in the index of personal names mentioned in the text: there are over 450 carefully dated entries.

Essentials of Gynecology

E. STEWART TAYLOR, M.D., professor and head of the department of obstetrics and gynecology, University of Colorado School of Medicine, Denver, Colorado. London: Henry Kimpton. 1958. Pp. 502. 84*s*.

This book contains not only all that is customary in a gynæcological textbook but also a chapter on preventive medicine as applied to gynæcology, chapters on the adrenal, the pituitary, and the thyroid glands, and a section on the gynæcological disorders of children. The subjects are well set out, the writing is clear (though symptoms and physical signs are sometimes rather mixed together), and illustrations are profuse. Here and there more attention is paid to a subject than seems appropriate in an "essentials"; for instance, sarcoma of the uterus, cancer of the fallopian tube, and chronic uterine inversion seem to be given too much space.

Naturally Professor Taylor presents the American view of the practice of gynæcology, which in many ways differs much from what is customary in this country. Perhaps the most interesting difference is the emphasis laid on the need for routine examination and investigation for the detection of malignancy before symptoms appear. In the second chapter of the book, devoted completely to this subject, the author writes: "We advise that all adult women have an annual physical examination until age 40. After the age 40 the physical examination should be performed each six months." The same part of the book emphasises the importance of self-examination of the breasts and the detailed technique of self-examination is described.

International Symposium on Mammary Cancer

Proceedings of the Second International Symposium on Mammary Cancer held at the University of Perugia, July 24–29, 1957. Edited by LUCIO SEVERI, Division of Cancer Research, Perugia, P.O. box 167. 1958. Pp. 870. £7 5*s*.

THE control of prostatic cancer by the oral administration of œstrogen is the one example of effective systemic therapy of cancer. Yet almost nothing is known of the factors concerned in the induction of prostatic cancer in man, and the disease has not yet been produced experimentally, By contrast mammary cancer in mice was studied by experimentalists in the early years of the century, and today a good deal is known about the causal factors in this and other species. Hormone withdrawal in women with breast cancer has been attended by some success, and extensive studies have been made on the hormonal status of the breast-cancer patient.

The time was therefore appropriate last year for an international symposium on mammary cancer, and this took place in Perugia, Italy, under the auspices of the International Union against Cancer.[1] The 135 participants represented almost the whole field of investigation. The proceedings are eminently readable; and there is a good index. This book, in conjunction with the proceedings of the Glasgow Conference held a month earlier [2] and the recent publications of Bulbrook et al.,[3] covers almost every aspect satisfactorily.

Emergency Surgery (7th ed. Bristol: John Wright. 1958. Pp. 1213. £9 9*s*.).—Mr. Hamilton Bailey's book is one of those down-to-earth matter-of-fact works which started with the stamp of personality and has grown in sturdy upright character since—despite the fact that there are now a dozen or so contributors to various chapters, in part or in whole. It is a work that makes no concessions to the slipshod; it has, in fact, set the standards for emergency work almost, one might think, throughout the world. There is a nice mixture of the thrilling case-report (cardiac massage in late blue asphyxia must have come from *Emergency—Ward 10*) with factual material. Some of the references have become hallowed with time and the index is not always accurate. But these are small complaints in a work so generous with information and illustrations. But are all those illustrations (there are 1576, more than one per page) really necessary? It is true that their very presence in some psychological way renders an already readable work even more so; but many hardly illustrate a point and they must add considerably to the cost of a work which is showing signs of expansion in other ways.

Discussions on Child Development (Vol. 3. London: Tavistock Publications. 1958. Pp. 223. 28*s*.).—This is the proceedings of the third meeting of the W.H.O. study group on the psychological development of the child. At this meeting in 1955 the development of sex differences in our own and other cultures was introduced by Margaret Mead, and the growth of the child's idea of self was presented by Erik Erikson. With such a broadly based gathering of distinguished participants, however, including Bowlby, Lorenz, Piaget, Grey Walter, and Julian Huxley, the discussion ranges widely. The week's meetings have been ably condensed to a third by the editors, Dr. J. M. Tanner and Prof. Bärbel Inhelder, and yet retain the spontaneity of actual conversation. Though the volume will be treasured by those working in this subject (which embraces a great many disciplines) as a faithful record of a unique occasion, this form of conference reporting is space-consuming and the reading of it is a daunting exercise for the non-specialist. Short summaries at the ends of discussions would have assisted the eclectic and brought the book, perhaps, to a wider public.

An Introduction to General Practice.—In last week's review of this book by Dr. Denis Craddock (published by H. K. Lewis) the price was wrong: it is 42*s*.

1. See *Lancet*, 1957, ii, 289.
2. Endocrine Aspects of Breast Cancer (edited by A. R. Currie). Edinburgh, 1957.
3. Bulbrook, R. D., Greenwood, F. C., Hadfield, G. J., Scowen, E. F. *Brit. med. J.* July 5, 1958, p. 7; Bulbrook, R. D., Greenwood, F. C., Hadfield, G. J., Scowen, E. F. *ibid.* p. 12; Bulbrook, R. D., Greenwood, F. C., Hadfield, G. J., Scowen, J. R. *ibid.* p. 15.

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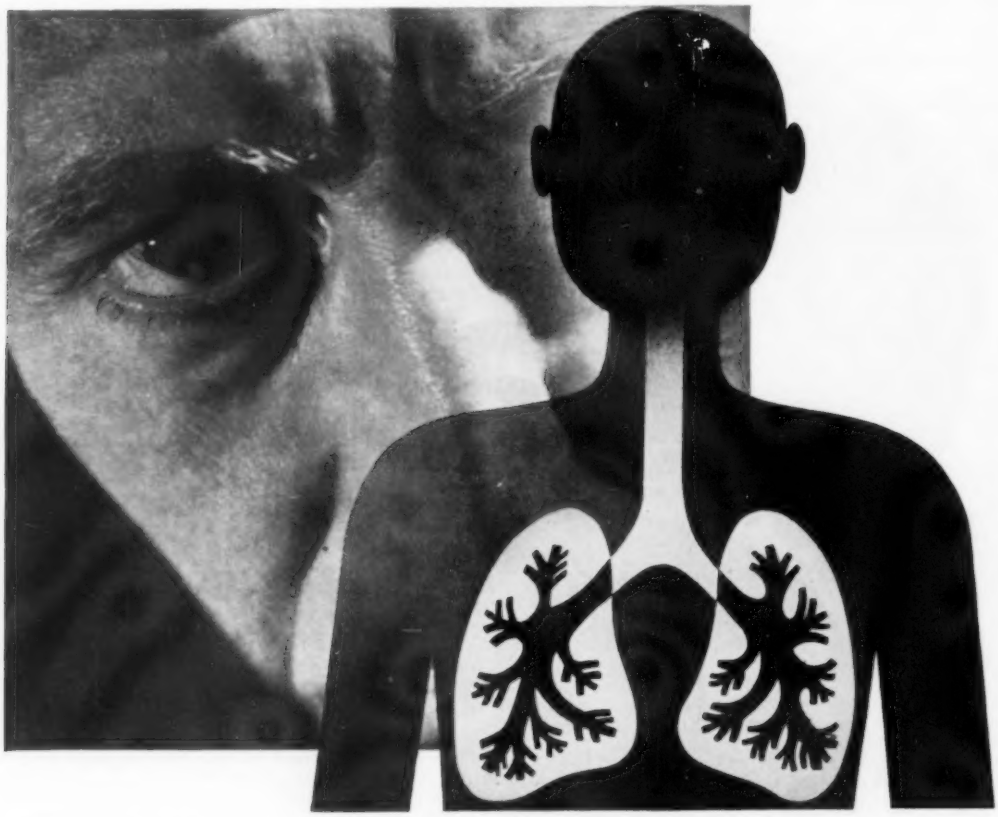

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THE LANCET
LONDON 29 NOVEMBER 1958

Medical Emigration: the Lessons

IN the past decade doctors have been leaving Britain in greater numbers than ever before. Of a large sample of established general practitioners, over 5 per 1000 emigrated last year alone.[1] For other groups there are no reliable figures; but in the profession as a whole the rate of emigration is almost certainly higher. Many are very able. Why do they go?

A few go in response to invitations, usually to fill university posts; and within limits such an exodus is to be welcomed as part of healthy academic exchange. Some go from motives that may prompt any other emigrant, such as the attraction of a less humdrum existence, a belief that children can be given a better life in other lands, inability to work easily with colleagues here, or concern lest Britain may be the epicentre of a war. Many more, who go to the "developing" countries, see there the best opportunity to exercise their skill fully. In taking this step they may place themselves financially at a disadvantage, and they and their families may have to live in less agreeable surroundings. But they have the reward—which few in this country can claim—of being truly indispensable. We should be glad of their willingness to take this step; for, so long as we lie at the heart of a Commonwealth, we must help its less prosperous members. We should surely do what we can to encourage this sort of emigration, in the same way as we should make it easier for young specialists to spend a year or two in Colonial centres where they can both teach and learn.[2]

The majority go, however, not to a Colony but to the U.S.A. or one of the Dominions, where, in a different social setting, they may expect to practise the sort of medicine that is practised here. We must face the fact that a main reason for this heavy one-way traffic is the young doctor's difficulty in establishing himself satisfactorily in Britain. We can offer almost unlimited opportunities for junior work in hospitals (indeed such vacancies draw large numbers of doctors from Commonwealth countries); but in practically every branch long delays must be suffered and fierce competition overcome before a man gains a permanent appointment. The truth is that we are training too many doctors for the posts we are at present willing to offer. This cannot go on. Both Britain and the other parts of the Commonwealth which look to us for help are in great need of more graduates in other faculties, especially science; and it would plainly be wrong to continue to devote money, laboratory space, and the skill of teachers to training doctors for countries which themselves are as well—or better—endowed with universities.

The Royal Commission on Remuneration has been given evidence that, even when settled in a permanent post, a doctor may still be badly off; and we must hope that this will be remedied. But neither the wish for secure employment nor the wish for a better living is the chief motive of all who go to the "developed" lands. Some have already distinguished themselves here; and they, in company with many of their younger colleagues, are leaving for a different reason—namely, dissatisfaction with the circumstances of practice or the opportunities for research in Britain. Too often the British clinician of the mid-20th century has to work with 19th-century tools: the general practitioner may lack proper ancillaries and may not even have access to hospital diagnostic departments; while the specialist may have to divide his time wastefully between three or four different hospitals, and be denied such needs as a routine virology service or a biochemistry department equipped for modern tests. Compared with the United States, research here is being starved[3]; and a keen worker with an idea, who in North America could be sure of a warm welcome and unstinted support, may have a battle to extract even from a well-stocked hospital endowment fund a few hundred pounds for essential equipment. The potential emigrant, gazing across the Atlantic, sees practice pursued with vigour and vitality (although, admittedly, not always with perspicacity), and he sees research most lavishly supported. Nor are these the only attractions. The example of many who have gone tells us that full scope and full honour are accorded at once to those with merit, regardless of their age. In this country, on the other hand, underlying the sense of frustration among younger doctors is a conviction that we are not making nearly full use of our profession's resources; and this discontent crystallises round the seniority of our leaders.

Most of the best original work, and much of the most important clinical work, is done before the age of 40; and yet most of the key posts in our professional organisations are held by people well past that age. We should learn here, perhaps, from other professions: for instance, the appointment of headmasters in their twenties is now an accepted and successful practice. Here and there the universities, taking a proper risk, have returned to the old practice of appointing really young men to the control of large clinical departments. No similar spirit of enterprise is detectable in medical bodies outside the universities, where younger men are denied the share of power that they earn by their load of responsibility.

While priding ourselves on our ancient institutions we should recognise that these can be a source either of strength or of weakness. To be first in the field, as was Britain in the Industrial Revolution, means that machinery becomes obsolete at a time when other countries have new equipment. That is what has happened, all too patently, in our hospitals. But, properly used, such circumstances provide an opportunity to regain the initiative by a relative advance—an opportunity which may or may not be taken. If medicine

1. *Brit. med. J.* suppl. Nov. 15, 1958, p. 205.
2. See *Lancet*, Nov. 22, 1958, p. 1111.
3. See *ibid.* Sept. 27, 1958, p. 677.

in this country is even to be kept up to date, there is need of an impetus which will come neither from economic pressure (as in industry) nor from the drift of public opinion (as in the social services) but only from our own will. Who is to lead is only one of the questions that needs to be examined. Concentration on the National Health Service—that novel adventure—may have led us to suppose too complacently that the profession has been moving with the times. In fact this preoccupation has caused us largely to neglect problems that are our particular concern. How vigorously are we pressing for the sort of undergraduate training that will not positively disable a student for general practice in this country or for any sort of practice in some other countries? Are we attracting undergraduates and postgraduates to this country on the same scale as formerly, and if not why not? Are we clamouring, as we should, for a great deal more money to be devoted, by the Government and by benefactors, to research; and are existing research funds being spent down to the last possible penny? As to the N.H.S. itself, are we acknowledging that in these changed times resources should be partly reallocated; and, if so, how urgently are we representing this view to the Government? Sooner or later these and other questions must be squarely faced and honestly answered. No better start could be made than by questioning those who leave this country on the reasons for their going, and those who have settled overseas on their experience in the light of their earlier life here. Not all the answers would be free from bitterness or bias; but together they should throw a cold clear light on present weaknesses.

Neonatal Hyperbilirubinæmia

WHEREAS jaundice in the adult is always a symptom of definable disease, severe jaundice may occur in the newborn infant without apparent cause. Usually this disappears in the first week or two of life; but in isolated instances there is permanent brain damage, which is usually fatal. This condition, kernicterus, is associated with the deposition of bilirubin in the nerve-cells—especially those of the basal ganglia—but surprisingly is never found in adults with equal or even more severe jaundice.

The work of LATHE and his colleagues [1–3] has gone a long way towards solving this mystery; for, although it has been realised for some time that liver immaturity [4 5] rather than increased hæmolysis is the cause of "physiological jaundice", it is now established that the defect is a highly specific one of bilirubin excretion. LATHE et al. have calculated that a normal adult, with a bilirubin level of 10 mg. per 100 ml., could excrete in ten hours the bilirubin resulting from the breakdown of every red blood-cell in the body; whereas the liver of the neonate, having an efficiency of only 1–2%, cannot cope even with the normal 1% daily red-cell breakdown. Consequently any increase in hæmolysis, as in hæmolytic disease of the newborn, congenital familial hæmolytic anæmia, chemical poisoning, or even absorption of bilirubin from hæmatomas, commonly precipitates early severe jaundice. Similarly any further depression of liver function—e.g., in hypothyroidism,[6] galactosæmia,[7] or hepatitis, or in more specific errors of bilirubin metabolism, such as congenital familial non-hæmolytic icterus [8]—may lead to severe and long-continued jaundice.

Bilirubin itself is soluble in alcohol and fat but not in water; hence it cannot be excreted into the bile canaliculi or urine. Before this can happen bilirubin must be conjugated with glucuronic acid to form water-soluble bilirubin diglucuronide, and in the neonate, owing to deficiency of the enzyme glucuronyl transferase, this function is not well developed.[9–11] Many other substances are excreted as conjugates of glucuronic acid, and VEST [12] has shown that, while the adult can excrete 80% of a test dose of acetanilide in 24 hours, the neonate may excrete less than 10% in 48 hours but this function increases rapidly in the first 10–20 days of life and is normal by the age of 3 months.

Neonatal jaundice may sometimes demand particular treatment—e.g., the more severe varieties of hæmolytic disease of the newborn require early exchange transfusion to replace sensitised rh-positive cells by normal rh-negative cells—but in other cases symptomatic treatment designed to maintain the bilirubin at a safe level until the liver "matures" is indicated. The majority of normal infants are not exposed to any danger, because the bilirubin level rarely exceeds 10–12 mg. per 100 ml. in the mature infant or 15 mg. per 100 ml. in the premature infant [2 13 14–17]; but occasionally much higher levels are reached and kernicterus has been reported in otherwise normal infants.[18–24] Particularly high bilirubin values and kernicterus sometimes follow large doses of vitamin-K analogue,[9 13 25–27] while there may be a predisposing maternal factor as in a series reported from Singapore.[19] HARRIS et al.[28] have reported an increased incidence in infants treated with sulphafurazole; but the mechanism here may be that sulphafurazole displaces bilirubin from albumin, thereby facilitating its entry into the brain. There is no doubt, however, that kernicterus can develop where the only observed

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26. Moore, T., Sharman, I. M. *ibid.* p. 819.
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28. Harris, R. C., Lucey, J. F., MacLean, J. R. *Pediatrics*, 1958, **21**, 875.

abnormality is a high bilirubin level. Experimentally produced brain damage in animals facilitates the deposition of bilirubin in nerve-cells [29–32]; and anoxia may be a predisposing factor in the human,[21 33 34] for MILLER and REED [35] have shown that bilirubin levels are higher in infants with prolonged respiratory difficulty than in those where normal respiration is rapidly established.

In most reported cases of kernicterus the bilirubin value has exceeded 20 mg. per 100 ml. [9 19 36 37]; but there is no absolute critical level,[13] for examples have been reported with values as low as 12·6 mg. per 100 ml.[9 13 38] DINE [14] claims that kernicterus can be expected when the bilirubin value excedes 16 mg. per 100 ml. CROSSE and her coworkers [23] estimate that this complication will develop in 66% of infants with values of over 18 mg. per 100 ml., but the view that kernicterus is rare when the bilirubin does not exceed 10 mg. per 100 ml. but likely at levels over 30 mg. per 100 ml.[39] is probably more correct.

There are many reasons for this diversity of opinion. Clinical assessment of jaundice is very inaccurate [13 36]; and bilirubin levels may change rapidly [28 38]; but the main reason is lack of uniformity in bilirubin estimation. Different techniques are used by different workers. It is difficult enough to get comparable answers in laboratories using the same method, but where methods differ comparisons are impossible. Dr. NEWNS and Dr. NORTON report elsewhere in this issue a series of cases where the van den Bergh test, using a Lovibond comparator, was used. The Malloy and Evelyn method gives higher results than that of King and Coxon; but LATHE and RUTHVEN [40] have described a modification of the Malloy–Evelyn technique suitable for use on heel-prick specimens which gives results only 10–15% higher than those obtained with the King and Coxon technique. Dr. FORFAR and his coworkers report elsewhere in this issue a series where blood specimens were obtained by repeated fontanelle puncture.

There is no evidence that the risk of kernicterus, at similar bilirubin levels, is particularly great in premature, mature, or erythroblastotic infants [14 16]; therefore it seems best at present to treat each group similarly. The cord-blood bilirubin value is the same for "premature" and "mature" normal infants and is unrelated to the subsequent course of jaundice.[2 14 41] In fact the bilirubin values run parallel for the first 3–4 days; but whereas in the mature infant the value reaches its peak at this time, in the premature infant the level continues to rise up to the 6th–7th day.[23 41]

Accepting that deep jaundice may be dangerous, what method can be employed to maintain the bilirubin at a "safe" level? Neither sunlight [42 43] nor the administration of sodium glucuronate [44 45] has yet been proven safe or effective; therefore exchange transfusion, already established in the management of hyperbilirubinæmia in hæmolytic disease of the newborn, remains the treatment of choice. In what proportion of cases will such treatment be necessary? CROSSE and her coworkers [36] state that the incidence of prematurity kernicterus is 1·08%, which represents about 500 cases in England and Wales each year; and, taking a bilirubin value of 18–20 mg. per 100 ml. as their indication, they found it necessary to perform exchange transfusion in 92 of 1320 premature infants. Others place the risk much lower, although the smaller the infant the greater the risk [2 35 41] except in so far as many very small infants die early from other causes.[36] Inquiries at two maternity hospitals have revealed almost identical experience over the past eighteen years. Altogether 18 cases of prematurity kernicterus have occurred in 3364 premature infants, but during the past two years, when only small doses of prophylactic vitamin K have been employed, there have been only 2 examples in 827 premature infants, while another infant was treated by exchange transfusion when the bilirubin level reached 25 mg. per 100 ml.

In the series reported this week by FORFAR and his colleagues (p. 1131) the bilirubin level reached 15 mg. per 100 ml. in 12% of premature infants, and exchange transfusion was employed in approximately half of these. NEWNS and NORTON (p. 1138) record bilirubin values as high as 35 mg. per 100 ml. in mature infants but 43 mg. per 100 ml. in premature infants, the level being highest in infants of less than 32 weeks' gestation or weighing less than 1600 g. They performed exchange transfusion in 9 infants with values of over 20 mg. per 100 ml., but 25 other infants with bilirubin levels of this order who were left untreated recovered without sequelæ. This illustrates again the uncertainty as to what constitutes dangerous hyperbilirubinæmia.

FORFAR and his coworkers are mainly concerned with the technique and efficacy of exchange transfusion in removing bilirubin. They establish that more bilirubin can be removed than that calculated to be present in the infant's circulation at the start of the procedure, and give support to LATHE's hypothesis [37] that there is a shift of bilirubin from the interstitial fluid to the plasma during the procedure. They point out that the amount of bilirubin removed is more important than the level of bilirubin at the end of the transfusion. It is quite obvious that in these cases exchange transfusion is most efficient per unit volume at the start, but the bigger the transfusion the greater the amount of bilirubin removed. It might be imagined that the slower the procedure the more effective, and also that to interrupt the transfusion for $\frac{1}{2}$–1 hour might be beneficial. FORFAR et al. could not confirm this latter point, and we do not know to

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what extent the interchange of bilirubin between plasma and interstitial fluid depends on the relative albumin concentration in each. Their main conclusion is that an exchange of 80 ml. per lb. completed in 1–1½ hours is safe and satisfactory. But, if this is so, the recommendation of NEWNS and NORTON that the exchange should amount to 40 ml. per kg. must be wrong.

It is apparent that whenever early or deep jaundice is found in a newborn infant, an underlying cause should be sought and treated. Difficulty will often arise in the diagnosis or exclusion of hæmolytic disease due to incompatibility with the ABO groups. Repeated bilirubin estimates by an accurate, standardised procedure are necessary in all deeply jaundiced infants, and the risk of kernicterus in relation to birth-weight and bilirubin level needs to be re-evaluated. Exchange transfusion remains the treatment of choice in infants where a reduction in bilirubin is needed.

Annotations

SKIN ANTISEPTICS

IT is impossible to render skin sterile without destroying it. Skin antiseptics therefore are always something of a compromise, because they must cause the greatest possible destruction among the huge bacterial population of the skin while doing the least possible damage to the skin itself. Probably the skin antiseptic which most efficiently destroys bacteria is 2% iodine in 70% alcohol.[1] Unfortunately iodine may cause skin irritation, and this has been reported [2] even when the iodine was removed with spirit within five minutes of application. Owing to the risk of skin reactions many surgeons prefer not to use iodine for routine skin preparation. Where bactericidal efficiency is of paramount importance, however—for instance, before lumbar puncture—iodine in spirit remains the antiseptic of choice.

Many of the newer antiseptics damage skin much less than iodine, but some of them destroy skin bacteria very much less efficiently. Cetrimide and other quaternary ammonium compounds and hexachlorophane have been recommended as non-irritant antiseptics for preoperative preparation. But these antiseptics, of proven value in other fields, are not so satisfactory for this purpose. The quaternary antiseptics are considerably less effective on the skin than in vitro, and their rather slow action [3] against gram-negative bacilli is a definite disadvantage. Hexachlorophane is useful mainly owing to its cumulative action—a property that does not manifest itself after a single application to the skin before operation. On the other hand, it is one of the few antiseptics not antagonised by soap and it can readily be incorporated in soap preparations. If hexachlorophane soap is used for washing three or four times a day, and ordinary soap is not used, there seems to form on the skin a film of antiseptic which kills bacteria already present and prevents the lodgement of others. In some maternity hospitals hexachlorophane soap has been used exclusively for washing babies in order to prevent staphylococcal skin infections, and its incorporation in a dusting-powder has been recommended.[4] In surgical practice hexachlorophane is not suitable for preoperative skin preparation because a single application has little effect, and it is satisfactory for the surgeon's hands only if he is prepared to use hexachlorophane soap every time that he washes them, in the hospital and at home. Frisch et al.[5] have tested the efficacy of these antiseptics by estimating the number of bacteria recovered from the hands by washing in sterile water before and after five minutes' application of each antiseptic. The quaternary ammonium compound 'Zephiran' and hexachlorophane proved only slightly better than a five-minute soap-and-water scrub.

Perhaps the most valuable of the newer antiseptics is chlorhexidine ('Hibitane'). It does not irritate the skin even when used repeatedly; it is very active against almost all bacteria; and a single application is effective. Lowbury [6] has summarised the clinical applications of chlorhexidine, which he considers a valuable skin antiseptic. The form recommended for application to the patient's skin before operation is 0·5% in 70% alcohol, and this seems to be suitable for rinsing the surgeon's hands after the customary soap-and-water scrub. At the moment chlorhexidine is perhaps the best compromise between bactericidal effectiveness and harmlessness to the skin. Another agent which in the future may prove to be of great value is 'Virac', a chemical combination of iodine and a quaternary antiseptic. Frisch et al.[5] found that it was by far the most effective of the skin antiseptics tested; it seemed to retain the strong bactericidal action of iodine but to have lost most of iodine's irritant effect on the skin.

PRACTITIONERS' PROGRESS

IT is only recently that the profession and the public have begun to acknowledge general practice as an academic discipline in its own right. Perhaps this recognition was delayed by the family doctor's tradition of personal service. Patients develop a sense of almost owning their doctor, of a proprietary right taken out when they join his practice; and they find it difficult to associate such a familiar figure with such remote activities as teaching and research. They do not often read the annual reports of the College of General Practitioners which year by year chronicle fresh advances in undergraduate teaching, postgraduate education, and research.

In the spring the college moved into a new building—41, Cadogan Gardens—the gift of the anonymous donor whose generosity is making possible the planning of its ultimate home in Lincoln's Inn Fields. The college now has over five thousand members and associates, for whom this will be a headquarters with a council chamber, offices, and the nuclei of a museum and a library. One room is set aside for the demonstration of practice equipment and designs of professional premises.

On July 1 the foundation of the Australian College of General Practitioners marked the achievement of autonomy by the six faculties of the college in Australia. Strong links of shared administrative procedure and of mutual regard remain to bind parent and daughter colleges together. There are now eight overseas faculties of the college as well as twenty-one at home.

The greater part of this year's report [7] relates to the work of the three main committees of council.

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5. Frisch, A. W., Davies, G. H., Krippaehne, W. *Surg. Gynec. Obstet.* 1958, **107**, 442.
6. Lowbury, E. J. L. *Practitioner*, 1957, **179**, 489.
7. College of General Practitioners: annual report, 1958. Pp. 116. Obtainable on request from College of General Practitioners, 41, Cadogan Gardens, Sloane Square, London, S.W.1.

The undergraduate education committee has published a booklet describing its policy, and the college teaching register which contains full details of over a thousand practitioners who are willing to teach students in their practices.

The postgraduate education committee has organised many courses and lectures in the faculties, and is pioneering a method of postgraduate education new in this country—the recording of lectures and discussions on tape or disc. This medical recording service has met with enthusiastic support from those who found difficulty in getting to organised lectures and courses.

Remarkable progress has been made by the research committee, supported by a research register of over six hundred doctors who have expressed interest. A dozen projects are either in progress or in an advanced stage of planning. The variety of subjects reflects the variety of general practice itself; studies of chronic bronchitis, epilepsy, pernicious anæmia, and asthma are taking place, and investigations into the natural history of hypertension and the incidence of diabetes are planned. The epidemic observation unit has been continuously at work, taking full advantage of the opportunities offered by the epidemics of Asian influenza and acute bronchiolitis which occurred during the year. A trial took place of the methods to be used in running the college records unit, which will study the morbidity seen by general practitioners. This may be the research committee's most important task, for the information sought is unobtainable elsewhere.

Realistically the research committee accepts that general-practitioner research cannot continue indefinitely, and expand, on the basis of good will and self-sacrifice by the doctors themselves. Apart from the limited help by outside bodies for specific projects, the main source of finance is the personal income of the doctors who take part. The council suggests that, from an increased research fund, research registrarships be established. These would enable practitioners who plan and organise research to have help in their practices while at the same time enabling young men to be trained in the principles of field research in practice. This suggestion merits careful thought, for younger men with this special experience and training will be needed as medical schools open or strengthen departments of general practice. In general practice there are unique opportunities for research into matters of mental and bodily health which affect us all. But if the college's valuable research work is to continue it must be assured of financial support.

CONTRACTION OF WOUNDS

THE processes involved in the healing of simple incised wounds are well known,[1] but new evidence and ideas are being brought to bear on the healing of wounds in which there is loss of full thickness of skin and the edges cannot be brought together—i.e., healing by granulation. Much work has been done on this problem [2 3] in efforts to minimise painful or ugly scars or the resulting impaired mobility. The tissues involved are the regenerating epithelium and the granulation tissue, but exactly why the wound contracts is still in doubt.

It has been generally accepted since Carrel's [4] work that the contraction results from shrinkage of the granulation tissue. Some observers [4 5] found that large wounds contracted relatively more rapidly than smaller, while others found no such difference [6]; rectangular and triangular wounds contracted more rapidly than circular, and contraction in young skin was more rapid than in old. It has been argued [5] that a recently healed primary wound accelerates the rate of healing of a secondary wound owing to a systemic "wound hormone" or "trephone" [7]; but Billingham and Russell [6] could not confirm this, and Cameron [8] showed that factors responsible for this appearance were more general than specific. The fact that cortisone, which inhibits the formation of granulation tissue, delays considerably the rate of contraction [6] supports the contention that the granulation tissue is responsible for the contraction. Many workers accept that the contraction starts before collagen fibres are fully developed; and Abercrombie et al.[9] have shown that contraction was not impaired in scorbutic guineapigs, though formation of collagen was severely inhibited. Thus it is suggested that the contractile forces are generated by the mesenchymal cells.[6]

Grillo et al.[10] have correlated changes in the composition of granulation tissue with the progress of contraction.

Using standard techniques for wounds of about 4 sq. cm. to establish the normal rates of contraction, these workers excised the wound contents at three-day intervals and analysed the granulations chemically. These analyses did not support the contention that the granulation tissue in the wound margins could be causing the contraction.

A more mechanical approach was then adopted. It had been noted that two opposite sides of the original square wound in the controls moved inwards steadily until they met, while the other two sides moved inwards early in the process of healing (fifth to tenth days), remained stationary for ten days, and then retreated to their original positions, thus between them leaving the well-known stellate scar. In the experiments where the central granulations were excised, either once on the seventh day or repeatedly every three days (care being taken to leave a narrow fringe of granulations along the margins of the wound), the rate of contraction of the wound was not affected at all—confirming the suggestion of the chemical analyses that the force of contraction did not originate in the central granulations. If the excision on the seventh day was carried out right up to tattoo marks made on the skin before the original wound (i.e., the whole granulating area was excised) the results varied: there was difficulty here in excising the granulations without detaching the skin from the base outside the line of excision; sometimes contraction proceeded as in the controls, sometimes it was delayed, but the wound never actually enlarged. When excision on the seventh day included $^1/_2$ mm. of the original skin margin down to the deep fascia as well as all the central granulations, the wound edges retracted, causing enlargement of the wound area; and after a few days contraction was renewed at a rate comparable to the original; thus the forces causing contraction were not beyond the original wound area.

These experiments drew attention to what Grillo et al. describe as a "picture-frame" area—a narrow strip 1 mm. in width including the original skin edge and a narrow line of adjacent granulations. When this alone was removed, the wound enlarged in area and then resumed contraction as in the previous experiment. The same result was obtained when the central granulations were removed and the margin of the wound was deliberately freed from the fascial base. When the edges were freed repeatedly, without any removal of tissue, the wound did not contract and, if it was finally left alone after fourteen days, the final area was much larger than that of control wounds and was based on a thick collagenous plaque. Grillo et al. therefore conclude that the force causing contraction of a wound lies in this picture-frame area at the margin of the wound which becomes adherent to the deeper tissues and, almost

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like the epithelium,[11] slides in towards the centre. It has already been shown that the deeper tissues are not distorted by a wound healing above them.[6]

Conditions in these healing wounds in laboratory animals are not the same as in man. In the animals the skin is loose and not attached to the deeper tissues at many points, while there is the panniculus carnosus—the subcutaneous muscle which enables the skin to twitch so extensively. In man most of the skin, having many attachments to the deep tissues, has not this great mobility. Nevertheless this conception of the healing of skin defects depending on a picture-frame area around the margins emphasises that in man better healing of wounds is to be expected from filling in skin defects as much as possible by whole-thickness skin grafts.[12] This prevents the slow development of fibrous tissue attached to deep structures and a layer of weak " scar " epithelium on the surface.[13]

BRILL-ZINSSER DISEASE

THE curious history of Brill-Zinsser disease has always attracted attention. Perhaps the interest lies less in the disease itself than in the brilliant studies that disclosed its nature. For it has never been commonly seen; even in 1910, when New York had an enormous population of newly arrived Polish or Russian-born Jewish immigrants from typhus-endemic areas, there were only 22 recorded cases.[14] After 1914 mass immigration to the United States from eastern Europe virtually ceased and from then on the incidence steadily declined. What is odd is that until 1946 no established case seems to have been seen outside the eastern seaboard States of the U.S.A. In that year Mooser and Loeffler [15] reported a case from Zürich, and in 1950 Hawksley and Stokes,[16] in this journal, recorded one in Great Britain. Since then two more [17 18] have been recognised here, and the disease has also been identified in Bosnia [19] where typhus is endemic. Zinsser's hypothesis [14] that Brill's disease is in fact a recrudescence of epidemic typhus, often contracted many years before, has been amply confirmed [20–23]; but we still do not know how the dormant rickettsiæ, held in the tissues after clinical recovery from the original infection, are reactivated.

In the *Journal of Hygiene* Lawy, Beattie, and Bensted [5] describe a serological survey of Polish refugees undertaken to determine, if possible, whether the not inconsiderable population of Polish-born subjects now living in this country represent a risk of further cases of Brill-Zinsser disease. (In two of the three reported British cases the patients came from Poland.) Broadly, the findings were substantially the same as those of a recent similar survey in the U.S.A.,[24] but some additional points are made. Of 318 Polish-born adults examined, 94 gave a history of typhus, and 45% of these had significant complement-fixing antibodies to epidemic typhus. Of the 224 without any history of the disease, no fewer than 27 had typhus antibodies in their sera. Of the whole 318—an unselected sample of the population of refugee camps—22% had typhus antibodies. The authors suggest that those with antibody but no history of typhus had in fact been infected in early childhood, when the disease is often so mild as to be overlooked. A control group of 174 British-born subjects included 32 who had been immunised against epidemic typhus ten to twelve years previously, but nobody in this group showed significant typhus antibody.

Lawy et al. think that complement-fixing antibody persisting for forty years or more after recovery from typhus is unlikely to be true residual antibody from the original infection and they would explain it by a continual slow release of small amounts of antibody from the tissues holding the dormant rickettsiæ. If this hypothesis is correct, long persistence of antibody indicates a carrier state, with a possibility of reactivation and illness. Their findings suggest that Brill-Zinsser disease may still be seen very occasionally in this country, and that this diagnosis should always be considered in a patient with a history of typhus and an intolerable headache. The laboratory tests of choice are the rickettsial agglutination or complement-fixation.

LYMPHADENOPATHY IN RHEUMATOID ARTHRITIS

ENLARGED lymph-nodes can be found in about 30% of cases of rheumatoid arthritis.[1] Failure to recognise the relation of joint disease to lymphadenopathy, and the nature of the histological changes in the affected nodes, has occasionally led to misdiagnosis. In a study of lymph-nodes from cases of rheumatoid arthritis Cruickshank [2] encountered two cases in which confusion with follicular lymphoma had arisen, and he found reports of cases in which Hodgkin's disease, reticulum-cell sarcoma, and lymphosarcoma had been mistakenly diagnosed.[3 4]

In Cruickshank's material follicular hyperplasia and sinus catarrh were the commonest reactions; histiocytic and diffuse lymphocytic infiltration were each found in a single case. The follicular hyperplasia and sinus catarrh were non-specific, though the former was more pronounced than that usually seen in reactive hyperplasia associated with chronic inflammation. Enlarged nodes were sometimes topographically related to actively inflamed joints, but in other cases the lack of any such association justified the conclusion that lymphadenopathy is one more example of the systemic manifestations of rheumatoid disease. Comparing examples of follicular hyperplasia in rheumatoid lymph-nodes with follicular lymphoma, Cruickshank found that the principal differences were that phagocytosis and plasma-cell infiltration were practically confined to the former, whereas infiltration of medullary tissue was peculiar to follicular lymphoma.

Histological examination of lymph-nodes seems to be of limited value as an aid to diagnosis in rheumatoid arthritis, though an occasional case of lupus erythematosus may be identified from the presence of necrosis and hæmatoxylin bodies in a node. In most of Cruickshank's cases of lupus erythematosus the lymph-nodes showed nothing more specific than sinus catarrh. The diagnostic pitfalls of rheumatoid lymphadenopathy should usually prove avoidable if pathologists are aware of the possible histological patterns and are told that the patient has rheumatoid arthritis as well as enlarged lymph-nodes.

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Special Articles

THE EPIDEMIOLOGY OF NOCTURNAL ENURESIS

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THIS paper records a detailed survey of 20 randomly selected enuretics, with 20 matched non-enuretic controls. The aim was to get a detailed picture of enuresis and the enuretic child and to compare him and his environment with the non-enuretic.

All the enuretics in the school population of a division of the West Riding were listed according to age and sex (108 boys and 72 girls). In the same ratio, 12 boys and 8 girls enuretics were selected by random sampling numbers. Each enuretic was paired with a non-enuretic child of the same age and sex, living in the same district of the division and attending the same school. Each child was physically examined and its mother interviewed, using an open-ended interview.

Findings

ILLNESSES EXPERIENCED

No. of illnesses at ages	Enuretic	Control	P
<2	10	10	—
2–3	16	6	0·01
3+	56	49	0·42

The only statistically significant difference (P less than 0·05) is found between 2 and 3 years of age—a time when most children are achieving nocturnal bladder control. This could be because:

1. Enuretics are more susceptible to illness than normal children. If this were so, we could expect them to show the same susceptibility in the other age-groups, which they do not.

2. Their environment is poorer, and they are therefore more exposed to infection. But they have no excess of illnesses at the age of 0–2 when environmental conditions are most likely to produce disease.

3. Illnesses at 2–3 years of age interfere in some way with the development of bladder control and thus predispose to enuresis.

INPATIENTS IN A HOSPITAL

Comparing hospital admissions (for all reasons other than enuresis), it is evident that the enuretics have been in hospital more than the controls:

Ever been in hospital	Enuretic	Control
Yes	12	5
No	8	15

P = 0·02.

Either (1) enuretics are more prone to illnesses necessitating hospital admission, or (2) admission to hospital—particularly at an age when the child is achieving bladder control—can delay this control. In support of the second explanation I give the early history of 3 enuretics (the only 3 in my survey who, about the age of 2, had given their parents hope that they would dry up).

1. A girl aged 9. At 18 months she was wetting the bed about three nights a week. She then had a burn and was in hospital three months. When she came home she wet the bed every night, and she continued to do so until she was 8, when she began to improve (dry five nights a month). No other person in this family wet the bed later than normal.

2. A girl aged 7. At 2 she was wetting the bed sixteen nights a month. She then spent a month in hospital with suspected poliomyelitis (diagnosis never confirmed). Since leaving hospital she has been wet every night. She has a strong family history of enuresis.

3. A boy who, at the age of 1 year, was beginning to have dry nights, went into hospital with scarlet fever. He wet his bed frequently in hospital and has done so every night since. His brothers and sisters achieved bladder control at normal ages.

TYPE OF HOUSE

Type of house	Enuretic	Control
Back-to-back	5	2
Through terrace	7	7
Semidetached	7	8
Detached	1	3
Council houses	8	8

P = 0·27.

No statistical difference is evident from the above figures. But on comparing the type of house in which the child lived up to the age of 3, one finds that the enuretics were worse housed:

Type of house lived in during first 3 years	Enuretic	Control
Back-to-back	12	4
Through terrace	6	8
Semidetached	1	1
Detached	1	1

P = 0·01.

INDOOR TOILET IN THE HOUSE

Toilet in the house	Enuretic	Control
Always	4	13
Part of life	12	5
Never	4	2

The numbers with access to an indoor toilet are significantly different in the enuretic and control groups. For this there are two possible explanations:

1. Houses with outside toilets are usually the older ones—often bad houses in the worse areas of the town. As we have already seen, the enuretics in the first 3 years of their lives lived in the worst houses.

2. In houses with outside toilets there is more difficulty in toilet training, especially at night. Added to this is the fact that all people dislike the idea of outside toilets and especially dislike a shared toilet. This may result in an unpleasant emotional atmosphere about toilets, toilet training, &c., which may colour the attitude of both parent and child and perhaps predispose to enuresis.

CONSTITUTIONAL FACTORS

Compared to the controls, more of the enuretics have relatives who are or were themselves enuretic. This information may be biased, since enuretic families are interested in enuresis and are more likely to know of, and call to mind, the existence of enuretic relatives.

Age when parent ceased bedwetting	Mother		Father	
	Enuretic	Control	Enuretic	Control
0–5	15	20	18	20
5–10	2	—	—	—
10–15	1	—	1	—
15+	2	—	1	—

Comparing the incidence of enuresis in the parents of the enuretic and control children, the difference in mothers is statistically significant (P = 0·02), but the difference in fathers is not (P = 0·13). The following are the figures for sibs who are or were enuretic:

—	Enuretic	Control
Proportion of sibs enuretic	12/70 (17·2%)	2/58 (3·4%)

Many of the enuretics had grandparents, uncles, and aunts who had been bedwetters. The numbers of children with relatives (other than sibs) who are or were enuretic are:

Enuretic relatives	Enuretic	Control
Yes	16	7
No	4	12

SLEEP

Length of sleep (hours)	Enuretic	Control
<8	—	—
8–10	2	2
10–12	18	15
12+	—	3

P = 0·31. No significant difference.

Depth of sleep	Enuretic	Control
Extra deep	5	5
Deep	13	13
Not deep	2	2

No significant difference.

Type of sleep	Enuretic	Control
Disturbed	6	2
Restful	14	18

P = 0·06.

The above figures show that though more enuretics are disturbed sleepers, the difference between the groups is not significant.

BLADDER CONTROL

No. of nights wet per month	(20 enuretics)
<10	20
11–20	11
21–30	9

11 enuretics occasionally wet the bed more than once a night, and 6 frequently did so. Enuresis was sometimes less during absence from home.

2 out of 6 improved temporarily in hospital.
4 out of 9 ,, ,, at relatives.
5 out of 14 ,, ,, on holiday.

The improvement was, however, due to a more regular potting routine when away from home. Other aspects of control may be compared as follows:

Frequency of micturition	Enuretic	Control
Normal	12	17
Abnormally high	8	3

P = 0·06. No significant difference.

Urgency	Enuretic	Control
Yes	13	5
No	7	15

P = 0·01. Significantly commoner in the enuretics.

Diurnal incontinence	Enuretic	Control
Sometimes	10	3
Never	10	17

P = 0·04. Significant difference.

TOILET TRAINING

Age at which regular toilet training began	Enuretic	Control
<3 months	9	13
3–5 months	4	2
5–6 months	2	—
+6 months	5	5

P = 0·42. No statistical difference.

Troubles with toilet training	Enuretic	Control
Yes	8	3
No	12	17

P = 0·01. Significant difference.

The troubles associated with toilet training were mainly emotional, the child taking a dislike to being "potted". He refuses to sit on his pot, screams, and will not cooperate in training. This evokes various emotional reactions in the mother—anxiety, anger, resignation—and the child is trained under some degree of tension.

"Lifting" the baby about 10 P.M. to empty its bladder appears to have no effect on the development of nocturnal bladder control.

Lifted at 10 P.M.	Enuretic	Control
Regularly	4	3
Occasionally	2	3
Never	14	15

P = 0·68. No significant difference.

The commonest method of toilet training is regular potting after feeds and additional potting when the mother realises the child is going to micturate or defæcate. Most mothers know that they will not be successful at first but continue with this routine and are eventually successful. Some mothers who are impatient are disappointed with their early attempts and either cease training for a time or begin blaming the child for non-cooperation. It is about 9 months of age that difficulties become really severe: the child now "has a mind of its own" and often refuses to sit on its pot, screaming when forced to do so. It is at this stage that a happy mother-child relationship with regard to toilet training often deteriorates and a genetic predisposition to enuresis may be reinforced by this environmental factor. Troubles at this age often appear to go on until $1^1/_2$ to 2 years, at which time mother and child seem to settle down again. But the damage with regard to bladder control at night may have been done.

The changeover from baby's pot to the toilet seems to be achieved without difficulty except in families with outside toilets. The thrill of using the "big potty" like mummy and daddy, plus a string to pull, seems to help in this transition.

The age when toilet training begins is not, I think, of great importance provided the mother does not expect too much from her baby, and provided toilet training is accepted as just another part of baby's routine. A baby is bathed, dressed, fed, potted, put in its pram—the whole being a continuous process. Toilet training should not be singled out, and become a focus for emotional tension.

EMOTIONAL TROUBLES

Questions were asked to find out if the child suffered from emotional troubles. These are significantly commoner in the enuretic group:

Emotional troubles	Enuretic	Control
Yes	9	3
No	11	17

P = 0·01.

Difficulties at school (mother's impression) were also commoner in the enuretics:

Troubles in school	Enuretic	Control
Yes	6	1
No	14	19

P = 0·06.

On a larger survery the difference might become significant.

Information about the children's educational attainment was obtained from their class teachers. The enuretics are significantly the worse group:

Educational attainment	Enuretic	Control
Below average	12	4
Average	5	7
Above average	3	9

P = 0·01.

The teacher's impression of the child in school, the health visitor's impression of the child at home, the mother's comments about the child, plus my own observations, were considered together and the child was classified as emotionally normal or abnormal. Emotionally abnormal children are significantly commoner among the enuretics, though this of course could be a result of the enuresis:

Emotional state	Enuretic	Control
Normal	12	18
Abnormal	8	2

P = 0·01.

An attempt to assess the personality of the mothers revealed no significant difference between the enuretic and control groups:

Personality of mother	Enuretic	Control
Normal	13	15
Abnormal	7	5

P = 0·31.

Mothers were questioned about troubles or disharmony at home:

Emotional troubles or difficulties with or between parents	Enuretic	Control
Parental troubles	5	1
None	15	19

P = 0·02. Significant difference.

There were more home troubles in the enuretic group. It is noticeable in any group of enuretics who have dried up that if serious disharmony occurs in the home the enuresis often begins again

STATE OF BOYS' FORESKIN

Foreskin	Enuretic	Control
Normal	6	6
Coronal adhesions	3	3
Circumcised	3	3

No significant difference.

MOTHERS' OPINION OF CAUSE

Mothers' opinion of cause of bedwetting	Enuretic	Control
Don't know	3	4
Nerves and emotional stress	11	7
Weak bladder	—	1
Lazy	1	—
Lack of training and discipline	—	7
Heredity	1	—
Physical causes	4	1

It is interesting to see how many of the controls' mothers attribute enuresis to lack of training and discipline.

ADVICE AND TREATMENT (ENURETICS)

The mothers were also asked whom they had consulted about the bedwetting and what they thought of the various treatments suggested. Though all these children were wetting their beds more than ten nights each month in 1955, only 4 had visited their general practitioner that year about it. 3 had visited the school medical officer, and 2 a consultant.

Whom consulted (ever)	No. of children
No one	4
General practitioner	9
General practitioner and school medical officer	3
School medical officer and consultant	3
General practitioner and consultant	1

Treatment of the enuretic had included:

Type	No. who had the treatment	Helpful	No help
Drugs	16	4	12
Restrict fluids at bedtime	19	2	17
Lifting—at parents' bedtime	19	8	11
Bribery (monetary reward for dry nights)	6	2	4
Star system—red star for dry night, black mark for wet night	2	1	1
Ultraviolet light	1	1	—
Admission to hospital for investigation	1	1	—

Besides these orthodox treatments, parents had naturally tried various things suggested by well-meaning relatives and neighbours. One mother had tried a method that had been successful with the household's dog—namely, rubbing the child's nose in his wet bed—but it didn't work with the child.

The Effects of Bedwetting on the Bedwetter and his Family

13 of the 20 enuretics were said by their mothers to be upset by their bedwetting. Usually enuretics try to conceal the fact that they wet the bed, and 5 children were said to be extremely apologetic. They also hate their bedwetting to be mentioned when people outside the family circle are present.

Seventeen of the twenty mothers said they were worried about their child's bedwetting. The main worry seemed to be " will he *ever* become dry at night ?". Some mothers were also ashamed of their children or were disappointed that *their* children continued to wet the bed later than normal. In two families the enuresis caused friction between the mother and father, mainly because of the different ideas about management, father strongly expressing the view that the child was lazy and that spanking was the best treatment. In all the cases I felt that the mother-child relationship had lost something because of the enuresis.

The extra washing needed was a source of annoyance to 16 mothers, who complained that in their home every day was a washday. Two mothers always, summer and winter alike, dried the clothes in the house, because they were ashamed of continually hanging out bedclothes. One mother hung her washing indoors because her nextdoor neighbour (with a younger non-enuretic child) used to taunt her about her daughter still wetting the bed. Three mothers complained about the recurrent wetting causing the sheets to rot, and one mother stated that a mattress had been spoiled by the wetting.

Holidays are a trial and tribulation for families with an enuretic. Three mothers said they had not been on holiday but were waiting until their child was older and dry. Sixteen other families had been away on holiday and had difficulties of one sort or another. I quote the mothers' words:

" Always take a rubber sheet on our holidays!"—" We go and stay with my sister but we have to take our own sheets for

David."—" Only go and stay with relatives where I can do the washing."—" Go to one place regularly where they know about her and take our own sheets and rubber."—" Always go in a bungalow so I can do the washing."—" Take our own rubber and sheets."—" Always put napkins and rubber pants on him at night when we are away" (boy aged 9).—" Take a case just for him and always stay in caravans so I can do the washing."—" Never had a right holiday because of him, we have to go in caravans and I am washing bedding every day."—" We always take a rubber sheet and go to my sister's but we shan't go again as her auntie made fun of her and we had a row."—" Always go to Butlins: they provide rubber sheets."—" Take our travelling alarm clock, set it to go off every three hours and put under my pillow and I then lift him out and pot him every three hours; he has never had a wet night on holiday yet."

Summary and Conclusion

A survey of 20 enuretic children who were selected at random, suggests that a tendency to enuresis is inherited. The other causal factors include illnesses and admission to hospital when the child is between 1 and 3 years old, and mistakes or difficulties in toilet training.

Enuretics tend to come from poorer homes. Compared to non-enuretic children, they have more difficulties at school, more emotional troubles, and a lower educational attainment.

Difficulties caused by an enuretic child in a family are discussed.

FURTHER INTERIM INCREASE FOR DOCTORS

ON Nov. 20 the Minister of Health announced that the Government propose to make a further interim increase of 4% in the current basic remuneration of doctors and dentists in the National Health Service with effect from Jan. 1. This interim increase would be without prejudice to the recommendations of the Royal Commission, but the Minister had consulted the chairman, who had said that it would not embarrass the Commission in any way. The method of distributing the additional remuneration is being discussed with the two professions.

So far as the medical profession is concerned, the 4% increase will apply to current basic remuneration. It will apply to all general medical and dental practitioners and hospital medical and dental staff, from consultants down to junior house-officers, employed in the National Health Service.

It is the second interim increase since the Danckwerts award of March, 1952, for general medical practitioners, and the corresponding increases for hospital medical staff of April, 1954. The first interim increases were as follows:

April, 1957: 10% increase for junior hospital staff (up to senior registrar).

May, 1957: 5% on net incomes of general medical and general dental practitioners.

May, 1957: 5% increase in basic remuneration for consultants and senior hospital medical officers (excluding distinction awards).

The new increase will raise the average net income for general medical practitioners from £2333 to £2426, and the salary scale for hospital consultants from £2205–£3255 to £2293–£3385.

Salaries for junior hospital medical staff range from £1540 for senior registrars in their fourth year down to £468 for newly qualified house-officers holding preregistration posts. These will be raised to £1602 and £486 respectively.

The total cost of the 4% increase, for England, Wales, and Scotland, will be about £5 million a year.

MEDICINE ON TELEVISION

A MEETING on Presenting Medicine to the Public on Television, arranged by the Scientific Film Association, was held in London on Nov. 19.

Dr. RONALD WOOLMER, chairman of the S.F.A. Medical Section, introduced Mrs. Mary Adams as a pioneer of broadcasting who had introduced many of the more serious programmes into television.

Mrs. ADAMS said that several factors influenced a television programme, including the limitations of the technique; the people concerned; Parliament, which exercises overall authority; the audience; and the assessors, who include individual critics and the more scientific audience-research organisations. It was known that medical programmes achieve the highest reaction indices of any programmes on the screen, and had a fascination for professional men, patients and non-patients. But what was not known was the effect of the programmes on the public. Two extensive surveys had been carried out by the B.B.C. audience research department—one in conjunction with the series on Mental Health " The Hurt Mind " and the other into the more recent series " Your Life in Their Hands ".

Broadcasting had many achievements to its credit. As the radio doctor, Dr. Charles Hill had made constipation respectable. In other fields, television was now recognised as valuable in religious presentation. The Law had always been presented without much professional comment, but the attitude towards Parliament had altered considerably from the " fourteen-day rule " to the recent permission to televise the Queen in the House of Lords.

The charge of " sensationalism " suggested an immoral motivation which she did not believe existed among the B.B.C. producers. On the question of mixed audiences, it was appreciated that, though everybody had the opportunity of switching off their televison if they were upset by a programme, in practice they often did not do so. Some neurotics would watch every programme; but their abnormal behaviour was not caused by what they saw, though they provided ammunition for the antagonists. The charge of superficiality was not entirely unjustified, for condensation was essential. Television was but one medium presenting facts about medicine to the public; others included *Family Doctor*, the Press, advertisers of patent medicines, and sound radio. In fact, by combating superstitions and malpractices implied by advertisers, television could be most valuable. The effect of medical television programmes on the doctor/patient relationship was debatable; but they should increase the prestige of the medical profession, for they always presented the doctor in the right light. There was need for research into the effects of such programmes on the public, for experimentation with new techniques and new personalities, and for study of the possibility of publishing material as a preparation for and follow-up of programmes. Mrs. Adams asked for a more creative liaison between the medical profession and the programme planners and producers. So far all the ideas had come from the television people. Could not the profession suggest ideas and people for television programmes?

Mr. A. DICKSON WRIGHT expressed his surprise at the quantity of medicine being televised. He believed that health education caused hypochondriasis, and he recalled how as a boy he had heard his father speak of a tuberculous cavity, and how he had subsequently lost many nights' sleep because he discovered his own rib spaces and imagined them to be cavities.

Dr. CHARLES FLETCHER reminded Mr. Dickson Wright that hypochondriasis was always with us. All that a medical programme might do was to deflect anxiety from one organ to another. Dr. Fletcher felt that we lacked an organised research into the effects of the programmes (though there was plenty of gossip founded on individual patients), and he suggested that the College of General Practitioners might be able to cooperate in this. He believed that the programmes commonly reassured patients and were also useful for countering much of the advertising of patent medicines.

Dr. MARTIN WARE agreed with the need for more accurate assessment of the results, and felt that the B.B.C. research department's investigation in relation to "The Hurt Mind" was most unscientific. He was worried by the mixed audiences who watched the programmes; doctors decided just how much to tell each patient, but this was impossible with television. He was concerned also about the creation of television personalities in the profession.

Mr. MAURICE GOLDSMITH emphasised that television was but one medium for putting over health education, and, at least in America, it had been shown to be a secondary one. Doctors should use all media for this purpose. The medical adviser of "Emergency—Ward 10" (who wished to remain anonymous) said that, just as blood-curdling Westerns caused less emotional disturbance than newsreel shots of bloodshed in the Middle East, so dramatised medicine was more readily accepted than a television presentation of the real thing. As far as he knew there had been no public reaction against his programme.

Dr. BRIAN STANFORD said that doctors, as scientists, should be pleased to communicate their knowledge to others, but he wished that there could be more demonstration and less talk on television.

COLLEGE OF GENERAL PRACTITIONERS

THE sixth annual meeting of the college was held in London on Nov. 22. Earlier in the day Dr. G. F. ABERCROMBIE had delivered the fifth James Mackenzie lecture, in which he spoke on The Art of Consultation.

Dr. I. D. Grant was unanimously re-elected president for 1958–59. His portrait by Mr. Norman J. Miller Miller was presented to the college by Dr. W. S. Gardner, chairman of the Scottish council, on behalf of members and associates in Scotland.

Dr. Albert Schweitzer, Dr. W. N. Pickles, Dr. W. A. Conolly (Australia), Dr. A. Barrett Jameson (New Zealand), and Dr. M. R. Stalker (Canada) were appointed honorary fellows of the college. Dr. J. K. Paterson (Upton, Huntingdonshire) was presented with the Butterworth gold medal for 1957–58 for an essay on Second Opinions, the second prize being awarded to Dr. S. G. Gang (Cardiff). The subject for the 1958–59 Butterworth gold medal will be The Child is Father of the Man. Essays must be submitted to the chairman of the awards committee not later than Sept. 19, 1959.

The following faculty representatives were appointed to the sixth college council (1958–59):

L. W. Batten (North London), H. H. A. Elder (South London), E. A. W. Marien (East London), R. Cove-Smith (West London), George Swift (South-east England), J. C. T. Sanctuary (Northern Home Counties), W. G. Tait (Thames Valley), D. Scott Napier (East Anglia), R. M. S. McConaghey (South-east England), D. L. Crombie (Midland faculty), K. M. Foster (North Midlands), R. A. Murray Scott (Yorkshire), S. Freeman (North-west England), R. Harkness (North-east England), W. L. Selkirk (Merseyside and North Wales), J. N. M. Parry (Welsh faculty), Richard Scott (South-east Scotland), W. S. Gardner (West of Scotland), J. M. Henderson (East Scotland), G. Swapp (North-east Scotland), G. H. Clement (North Scotland), A. S. Boyd (Northern Ireland), V. G. Doyle (East of Ireland), J. P. J. Little (West Ireland), J. C. Walsh (South Ireland), A. B. Jameson (Auckland), H. E. W. Roberton (Canterbury), H. E. M. Williams (Otago), E. J. Marshall (Wellington), Mary Robertson-Glasgow (Kenya). Four elected members of council, to replace those retiring, were appointed: J. Fry, J. M. Hunter, R. J. F. H. Pinsent, and G. I. Watson.

The report of the criteria committee (Dr. K. McD. Foster, chairman) on a possible examination on the conduct of general practice as one of the criteria for future membership of the college, was discussed. A motion that no action be taken about this for five years was lost, and the report was referred to the faculties for their consideration. The college bylaws were amended and, by almost unanimous agreement, the annual subscription for members was raised from three to five guineas.

At a meeting of the new council held later, Dr. F. M. Rose was appointed chairman, Dr. Annis Gillie vice-chairman, Dr. H. L. Glyn Hughes hon. treasurer, and Dr. J. H. Hunt hon. secretary. Dr. G. F. Abercrombie, Dr. H. N. Levitt, and Dr. Charlotte Naish were appointed additional members of council.

On Nov. 23, under the chairmanship of Dr. I. D. Grant and Sir Francis Fraser, 180 members and associates of the college attended a symposium on Dyspepsia.

The college's latest annual report is discussed on p. 1164.

Medicine and the Law

Mistaken but not Negligent

A WOMAN patient underwent an operation for the removal of a small lump in her left breast in hospital in May, 1950.

An assistant pathologist who examined a portion of the cyst removed reported that the microscopic appearance was of an intraduct carcinoma in an area of cystic hyperplasia; and on that report the patient was sent to Mount Vernon Hospital for deep X-ray treatment. After the treatment had been carried out for some weeks the senior pathologist at the original hospital revised the diagnosis and reported it as chronic mastitis; and the Mount Vernon pathologist gave his opinion that it was not a malignant carcinoma. The treatment was thereupon discontinued, though the patient had by that time suffered the effects of it. The patient had herself read and copied the original pathological report which had been placed with her notes at the head of her bed in hospital, and was much distressed by its contents. She did not at any later date have any history of carcinoma.

She brought an action against the hospital management committee, the regional hospital board, the surgeon who performed the operation, and the pathologist, alleging negligence in the operative and postoperative treatment, and in the diagnosis. At the hearing before Mr. Justice Hilbery in October, 1957,[1] Sir Hugh Griffiths, a witness for the patient, gave evidence that he could find nothing wrong with the operative and postoperative treatment and the case in so far as it relied on those allegations was abandoned. The Judge accepted evidence given for the hospital authorities by Prof. R. W. Scarff that in his view there was evidence in the pathological specimen and slide which supported the report originally made by the hospital pathologist, and he dismissed the patient's claim. The patient appealed.

Lord DENNING said that the only effective part of the appeal was that relating to the diagnosis. Everyone must feel sympathy with the patient who was diagnosed as having cancer, and who with the curiosity which most ordinary patients would display had had a look at the notes over her bed and was naturally very troubled. If the proper diagnosis had been made at the beginning, she would not have had that distress or the pain or worry of the deep X-ray treatment and the ill effects of disfigurement and all the possible consequences of that treatment. On that part of the case Mr. Justice Hilbery had accepted the evidence of the expert witness Professor Scarff who had gone so far as to say that he might have come to the same conclusion himself. In those circumstances, could it be said to be negligence in a pathologist, when he came to a conclusion which a great expert might himself have come to? When there was such a debatable field and such difficulty in interpreting these slides, it could not be said

1. See *Lancet*, 1957, ii, 898.

to be negligence for a pathologist to appear to have come to a wrong decision. Some people might say that it would have been better for him to have taken a second opinion; but once cancer was diagnosed everyone knew that speed of treatment was essential. The mere fact that a second opinion was not taken and that there was no further additional check at Mount Vernon did not make out a case of negligence. It was one of those misadventures and chances which life held for people. Accepting, as his Lordship did, that this patient had never had cancer at all, a wrong diagnosis did not mean an unskilful or negligent diagnosis. Anyone might make a mistake in the affairs of life, but not thereby be guilty of negligence. In view of the evidence, and particularly that of Professor Scarff, the Judge was justified in finding that there was no negligence in the diagnosis or consequent on it. The appeal should be dismissed. Lord Justice HODSON and Mr. Justice LLOYD-JACOB agreed.

Crivon v. Barnet Group Hospital Management Committee and Others.—*Court of Appeal* (Lord Denning, Hodson *L.J.*, and Lloyd-Jacob *J.*). Nov. 18, 1958. The plaintiff in person. Counsel and solicitors: James Stirling, Q.C., and Gordon Friend (J. Tickle & Co.); Rose Heilbron, Q.C., and R. A. Barr (Hempsons).

M. M. HILL
Barrister-at-Law.

Damages for Mental Deficiency

Damages in the sum of £10,500 have been awarded to a 32-year-old man who became mentally deficient as a result of inhaling fumes from an oil-tanker lorry.[1]

The plaintiff was employed by a firm of motor-cartage contractors who operated a fleet of tanker lorries. The tanks of the lorries were cleaned frequently, and, after cleaning, employees climbed inside the tanks to mop up residue. In April, 1954, the plaintiff had been inspecting a tank and had climbed inside. Fumes overpowered him, and he had lain unconscious inside the tank as a mechanic drove the lorry out of the garage into the street. The mechanic, it was claimed, in starting up the engine in a confined space, caused carbon-monoxide gas to accumulate and enter the tank of the lorry where it was inhaled by the plaintiff. After half an hour he was missed, sought for, and found unconscious inside the tank. He remained unconscious for ten days, and was suffering from serious and permanent cerebral damage resulting in a state of organic dementia bordering on stupor.

Dr. W. S. Watson said in evidence that he had examined this man in November, 1958, and found that, although his physical condition was normal, he was unable to use his mind in any sensible or appropriate way. He did not know the date, month, or time, and still had no idea how to add up small coins. With some difficulty he could recognise a penny or a sixpence. He did not know the names of his brothers or his sister without great prompting. He had no idea of his age or the date of his birth. He could not proceed with the simple task of dressing or undressing. In Dr. Watson's opinion, the plaintiff's condition was consistent with damage to the brain caused by exposure to carbonmonoxide. The plaintiff would remain at his present level of simplicity; there was no treatment, medical or surgical, from which he could derive any benefit.

The defendants said that the plaintiff had not been required to clean the tank. Drivers were forbidden to enter a tank which had not been steam-cleaned. The tank in question had not been so treated. The defendants claimed that they had fulfilled all the duties incumbent upon them and that the accident had been caused wholly or partly by the man's own fault.

By a majority of nine to three a Scottish jury found the employers liable. They assessed total damages at £17,500, but held the plaintiff to be 40% to blame for the accident. In consequence, the damages payable by the employers were reduced proportionately.

1. *The Scotsman*, Nov. 19, 1958.

The Widdicombe File

I. IN THE DOLDRUMS

DEAR JOE,

So it's taken you only a year to become disillusioned. As a lecturer without consultant status you find yourself loaded with the routine work and without the time you'd hoped to spend on investigation and on university life.

Of course you must expect your chief to leave much to you and I know you're pleased and honoured to be of such service. He has many calls on his time; for when he isn't upholding British prestige overseas he has to attend to affairs of surgical state. (Boards and committees are the distractions which come with eminence and which, rather oddly, the eminent enjoy—a pleasure they're at pains to deny so that their fun may pass as an onerous duty nobly borne.) His duty, *you* think, should be to ensure that you and the other bright young men with you are relieved of tiresome routine so as to give you a chance to develop the university concept within medicine (or surgery, in particular). You may be right; and God knows we're in dire need of this development to get British surgery out of the doldrums. But you must remember that his interest is now turned outwards to national matters; the importance, in the national sense, of the contribution of the individual unit has been forgotten in a welter of business, the hurry and bustle to the committee room, and he's no longer really thinking about the need to create and preserve a milieu which will make that contribution possible. That's why you get no time for research, for reading, for sitting back and thinking. You need leisure and that's unheard of. I gather that holidays are frowned on—which is hardly surprising when he takes none himself.

Well you'd be better out of it; and if, as you say, the animosity of the part-time side towards the university unit is likely, if you stay long, to prevent your promotion to a consultant post, then you must start looking round now. But first some advice. To get a job you must prepare yourself by taking thought. The first absolute requirement for a surgical post in this country is conformity; there must be no suspicion of anything unusual, least of all of intellect. You must picture the scene at the average appointments committee. In the chair, someone from the board (butcher, baker, or candlestickmaker) in awe of the medical man—still with the illusion that medicine in all its branches, including surgery, is a learned profession. He regards himself as qualified to conduct the meeting but not to cross the opinions of the professional men present. And the professional men, probably all surgeons, will be in the majority. Safe kindly men, middle-of-the-road men, men who would do credit to a trade-union congress—all conformity and no kick. What are they looking for? Deference, a respect for anatomical laws, slaves to technique. Why? Because they were brought up that way themselves and have brought up others similarly. And they get what they want. Ask any candidate for a general surgical consultant post what he wants to make of the job if he gets it. As likely as not he'll say he's interested in thyroids: that he wants to specialise in thyroids. Everyone knows exactly what he means—he likes taking thyroids out. The slave to technique! And it's no good your protesting that he might intend to delve into something more profound such as the causation of thyroid disorder;

nothing's further from his mind. He thinks that thyroidectomy can be a specialty in itself, whereas any fool who is not utterly ham-handed can do the job and enjoy it. If it isn't thyroids, it's something similar; but there's one common factor—a mind dead to all but anatomy or technique.

Why should this be so? Among other things, I suppose, because of the primary F.R.C.S. exam. The persistence of this anachronism (I believe they still ask the 16 different ossification centres of the sphenoid—or is it 24?) denies the intending surgeon a period which would be fruitfully employed gaining education and experience in science in a university department (microbiology, biochemistry, what you will; but *not* anatomy). And what an advance it would be if exemption could be obtained on proof of a year's study in science at a university! Not only does it deny this period but it dulls his mind so much that his highest aim in surgery will be the development of a technique or an instrument, and his researches will be devoted to the anomalous branches of some footling artery which can in any case be observed at operation without prior knowledge of its course and behaviour. This is the state of affairs today: and it's reflected in the paucity of good papers presented at meetings of our surgical societies.

One after another, candidates appear before appointments committees with minds dulled to the level of craftsman. This will continue, for the primary F.R.C.S. is unlikely to disappear so long as surgery continues to be ruled by a gerontocracy—and so long as exams provide much-needed revenue for our colleges. It will continue because like breeds like; those who are appointing are safe men looking for safety, comfort, peace, and quiet. Do you suppose that the candidate for a surgical appointment who evinced an interest in D.N.A. rather than the thyroid would be thought to be anything but a crank and therefore unsafe to let loose on the public? And if he's done something a little unusual—served in a Friends Ambulance Unit instead of the Forces—do you really think he doesn't lose a mark or two?

So you must conform; you must have done the right thing in the right order with never a foot off the common path. You're a little suspect already, for you're tainted by contact with a university department (little will your interviewers know that this is, alas, no different from any other surgical firm!); so don't show any signs of independence at your interview. I have seen a man ruined thus. He had a long list of publications to his name and was asked why he'd never submitted to a certain journal. He replied simply and honestly that he didn't think it a very good journal. And he was right; but it cost him the job. And that was a university post, for which you might think independence of mind would be considered an asset.

Be careful, my boy, and give a thought also to where you wish to work; for the man on the spot has the better chance, and the longer he's remained rooted to the spot the better still. This is an absolute rule which, in my experience, applies everywhere. It is a common fallacy, and a recurring but erroneous theme in the correspondence columns, that the man "at the periphery" has no chance of a consultant post in competition with a candidate from a teaching centre. But in fact the wishes of the representatives from the area concerned prevail somehow or other in the committee, even in the face of "external" advice, and he has a better chance than anyone for appointments within his own hospital. Out of half a dozen at interview, I've seen the least acceptable candidate succeed simply through local support. He'd remained many years in one hospital, except for a year of rotation; he'd never held a job elsewhere; he'd been *born* in the place. And an interesting thing was that all the other candidates knew he was going to be the lucky man. I've seen such happenings in both regional and teaching hospitals. It's of no consequence that a man has too little enterprise to get himself out and about to see and hear other views and ideas. Quite the reverse: he stays so long in one place that his inertia and desire for security are looked on as loyalty to the hospital (and to those appointing him). And loyalty in this sense usually signifies complaisance—just what's wanted for a quiet life: he must be a sound man, a decent fellow. So choose your spot now, go there, and sit tight (and no contrariness, please).

Where is all this leading us? You'd better consider that, before making your final decision. We're inevitably becoming what we most despise—physicians' slaves; for we're technical craftsmen, ruled by rote, who'll soon perforce have to lean on others in matters calling for thought and even judgment.

Yours,

P. G.

PS.—Perhaps you'd better emigrate.

Public Health

Poliomyelitis Vaccination

STEADY progress in the programme of poliomyelitis vaccination is recorded in the latest returns from local health authorities. By the end of October nearly 7 million people in Great Britain had had one or more injections. They included just over 6,620,000 children under 15, of whom 6,320,000 had had two injections. A start had also been made in giving a third injection and this had been done in just over 239,000 cases. The registration of children under fifteen showed an acceptance rate of 59%, compared with 56% at the end of August. In the new age-group of 15 to 25 years, 13,324 had received two injections and 26,947 one.

A Ministry of Health statement this week urged those who were eligible and had not yet registered to do so straight away. "Ample supplies of vaccine are now available. British supplies are still limited and parents and others, including expectant mothers, are urged not to wait, but to accept the vaccine which is available locally." General practitioners are helping with the extended vaccination programme. Many are organising evening "walk-in" clinics.

Too Many X-rays?

In his report for 1957, Dr. Richard Dodds, medical officer of health for Smethwick, speaks of the many diagnostic X-ray examinations that are performed only because patients insist on them. ". . . time-consuming and costly diagnostic X-ray procedures involving repeated exposures of vital organs are regularly undertaken to exclude ulceration of the stomach and duodenum, kidney and liver disease in patients who obviously need re-housing more than re-X-raying or the exclusion of the in-laws rather than of liver disease. In this way the population receives more and more radiation, much of it to little purpose."

In England Now

A Running Commentary by Peripatetic Correspondents

THE adage that Life is short, the Art long, seems to invite the lay retort that if it wasn't for the doctors, Life might also be long. Anyway, the Art itself gets steadily shorter as it is replaced by technical skills. Less artful and more skilful, we tend more and more to start where our teachers left off. It takes less time to learn to read a thermometer than it did to acquire the art of estimating fever by touch.

We are more ready to admit ignorance, and our patients do not expect us to hide it behind vast whiskers and dog-Latin. Fifty years ago patients simply dared not die without the Old Doctor's permission, which was rarely granted to anybody under 80. It was also essential that the Old Doctor should be kind and inspire confidence. We must not forget, of course, that these qualities are found in many other good citizens such as policemen—as well as in people who are trying to sell things. Possibly, as the Royal Commission has hinted, our profession takes itself too seriously. I have yet to find a pub called *The Jolly Doctors*.

Nowadays our patients, having been dusted lightly with strontium-90, are figures in a card-index, and the doctor's business is to interpret the findings. Join up all the numbers and the answer appears, as in the puzzles in the children's comics of the pre-horror era. For the physicians there is a slide-rule on which they can line up the signs and symptoms and read off the diagnosis and probably the treatment. The surgeons are plumbers in fancy dress. The G.P.s are scribes, working their ballpoint pens to the bone allocating consumer goods. Our mystique, our zodiacal prescriptions, our portentous mutterings in the patient's bathroom are on their way to join the tophats and pus-stiffened frock-coats of an earlier generation. Soon our patients will read and interpret the instruments for themselves.

So must the old Polynesian navigators have felt, who guided their tribes' canoes across 3000 miles of ocean by instinct, luck, and some hocus-pocus with hollowed-out coconuts. Once they had the finest huts, the best seats at the revels, and the missionaries of the most appetising denominations. Then some ass introduced the magnetic compass . . .

• • •

Conversation in the mess at dinner became general.

"Do you find that yours gets weaker as the day goes on?" "No, but I think it's becoming hoarse," someone replied. "I'm a bit worried about mine—I think it's been dropped." The senior resident answered reassuringly, "That won't do it any harm; they're much tougher than you think. What annoys me is the strange noise it makes when anyone calls." Ours did that too, we hastened to inform him.

We were not discussing our children. Our hospital has just been fitted with a personal call system, and the staff take great interest in the condition of their receivers.

• • •

We have been assured in *The Widdicombe File* that we must publish or be damned; so we sent our brain-child to the Editor, and, appreciative of its outstanding merit, he has accepted. In due season it will be published. Will anyone read it? But of course. And how shall we know? Why, they will ask us for reprints. Soon the postcards will start coming in—from San Francisco and Sydney, from Manchester and Memphis—perhaps, who knows, even Moscow.

"Dear Dr. A,—I much enjoyed reading your interesting article on Hamburger's syndrome and would be glad of a reprint. (Signed) X— Y—."

For a moment our heads swell with pride. Why, even that world authority, the great X— Y— himself, thought it was interesting. But then a chill cloud of doubt comes over our elation. That printed postcard. Was that the great man's own signature, or merely that of one of his secretaries? Does he find *all* the articles on Hamburger's syndrome he reads enjoyable and interesting? Personally we thought most of the ones we looked up for our references pretty dull stuff. And since he has already read the article, what does he want a reprint for anyway? Admittedly some of it was a bit abstruse, but if he didn't quite master it at first reading why doesn't he go through it again in the library or wherever it was that he first read it?

Come to think of it, what *do* they want them for?

• • •

At last my appointment system is beginning to work well My secretary knows my speed and can decide fairly accurately how long a patient is likely to take. So when I look into the waiting-room now there are rarely more than two or three sitting there, though the total number I see is about the same as usual. But I am beginning to be worried. A frequent opening remark from a patient is "Not busy today I see, Doctor", or, brightly, "Trade isn't what it was", or more bluntly, with a look around the empty chairs, "Killing them all off, Doc?" But these are the extroverts. The introverts are not so happy. Sitting there in serried ranks they obviously felt some form of group comfort. At least they were all in the same boat. Now they wonder what has become of Granny with her bunions and Grandad with his bronchitis. The little bedwetter ("three times some night\$ Doctor"), how is he getting on? Perhaps the packed waiting-room is a valuable part of the treatment.

• • •

The divinity that shapes our ends must have been motivated by outrageous cynicism when it caused young Andrew to break his arm during the summer holidays. For once, the unfortunate little chump was not trying to rough-hew himself. Indeed he was, for him, behaving in exemplary fashion—walking, rather than hurling himself, up the garden step. He fell. He did not cry. He pointed to the unnatural shape of his forearm, nothing more. His one complaint, and that some four hours later in the casualty department of a local hospital, was: "They wouldn't let me have any tea—and it was jelly, Daddy." By the next morning the forbidden jelly was forgotten in the pride of possessing a plaster armlet, reaching from wrist nearly to shoulder. A drug-addict could take no greater care of his syringe than Andrew of his plaster bandage. He kept it whiter than the brighter detergent advertisements. He polished and furbished it daily. And then he returned to school. Within two days the elbow was chipped. Within a week nothing remained at that joint but a flimsy strip of muslin. "Fair wear and tear," I thought, as, emulating the highly skilled attendant at the hospital, I slapped on a new strip of plaster bandage. The weekend passed without signs of deterioration and, on Monday morning, Andrew trotted off to school again. By the evening, ominous cracks appeared in the plaster; by Tuesday it was chipped; and by Wednesday emergency treatment was again indicated. "What do you do to it?" I asked as I sculpted the elbow once more. He was obtuse but frank: "It just goes—and, well, Daddy, you don't know how to make it strong, not like the man in the white coat at the hospital." "Oh," I remarked coldly. "No," he went on, oblivious of my hurt feelings; "well, you see, when I hit people with it . . ." "When you what? You'd better not let Mummy hear that," I told him.

"But they hit me first."

"But why?"

"Well, they thought I couldn't defend myself, not with my arm like this." He paused, looked fondly at the two pounds or so of plaster on his arm, and added dreamily: "They don't think so now."

• • •

What good ideas they have in Aberdeen. For instance, in last week's *Lancet* (Nov. 22) they advertised for a Terminable Lecturer. Other places take a chance and sometimes find themselves landed with the quite Interminable Lecturer. But how will the chap be terminablated at the time of his terminability—left depolarised paralysed on his own doorstep or just deepfrozen out in the wynds one night? Let us spare a thought for the child allowance predestined to be an orphan allowance so soon. Aye, 'tis a hard life over the border . . .

Letters to the Editor

HYALINE MEMBRANE

SIR,—Students of hyaline-membrane disease have had much food for thought from your columns in recent months. One is grateful to Silverman and Nishihara [1] for exploding the myths of the increased risk to the second twin, and the relative immunity of very immature infants to hyaline membrane. Many other myths unfortunately remain, such as the initial period of wellbeing these infants are said to go through, and the deleterious effect of cæsarean section. Dr. Miller and his colleagues [2] look as though they will dispose of the first, and my colleagues and I [3] had hoped—apparently in vain—that we had corrected the second.

The emphasis placed on disordered pulmonary circulation in your leading article of Nov. 1 clearly reflects the general consensus of modern opinion. The evidence cited in support, however, was highly selected. There was no mention of Landing,[4] for example, who found no relationship between pulmonary œdema or hæmorrhage and hyaline membrane in histological material. It may be of importance that Landing took care not to classify areas of air-bubble formation in œdema fluid, or fibrin lamination in areas of hæmorrhage, as hyaline membranes. My experience of 91 fatal cases (unpublished) is similar to Landing's in that, compared to controls, I found œdema in about a quarter, hæmorrhage in about a quarter, and œdema in about a third of the cases. I cannot agree, therefore, with your statement that "the lungs of an affected newborn infant are intensely congested and œdematous". In my experience intense pulmonary œdema and congestion is seen when the membranes are very prominent and widespread, and not all cases of hyaline-membrane disease come into this category.

You do not mention Dr. Bonham-Carter's recent resuscitation [5] of the idea that the lung capillaries have an architectural function and contribute to the initial expansion of the newborn lung. If I understand Dr. Bonham-Carter correctly, he maintains that in infants with hyaline-membrane disease the alveolar capillaries do not erect at birth, either because of a shunt mechanism or because of increased pulmonary resistance. Now since many people hold that œdema fluid in lungs escapes from alveolar capillaries, especially when congested or distended, Dr. Bonham-Carter's theory seems to argue against congestion and œdema being a forerunner of hyaline-membrane formation. Then again, those who talk of the "pulmonary syndrome of the newborn" do not seem to have considered the possibility that much, if not all, of the congestion is a result rather than a cause of hyaline membrane. When one considers the extreme respiratory distress these infants may show, and the frequent terminal periods of apnœa, surely some pulmonary congestion and œdema is not to be wondered at.

There is no mention, either, of the idea of the respiratory epithelium itself being involved in the pathogenesis of hyaline-membrane formation, although Rosenthal,[6] Tregillus,[7] Ahvenainen,[8] Bruns and Shields [9] have presented evidence for such a transformation.

I agree fully with your final sentence on the need for knowing more about the pulmonary circulation and function of the newborn. In the past there has been too much speculation on these topics, as well as on hyaline-membrane disease, for which there are at least eight or nine theories on causation. Perhaps this has occurred because of the difficulties in studying respiratory disease in the newborn, but there are signs at last that these difficulties are being overcome. Certainly hyaline-membrane disease is common enough and important enough to deserve a strictly factual approach.

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Royal Victoria Infirmary,
Newcastle upon Tyne.

G. S. ANDERSON.

1. Silverman, W. A., Nishihara, M. *Lancet*, 1957, ii, 390.
2. Miller, H. C., Behrle, F. C., Smull, N. W. *Pediatrics*, 1958, **22**, 665.
3. Strang, L. B., Anderson, G. S., Platt, J. W. *Lancet*, 1957, i, 954.
4. Landing, B. *Pediatrics*, 1957, **19**, 217.
5. Bonham-Carter, R. E. *Lancet*, 1957, i, 1292.
6. Rosenthal, M. *J. Pediatr.* 1935, **6**, 71.
7. Tregillus, J. *J. Obstet. Gynæc., Brit. Emp.* 1951, **58**, 406.
8. Ahvenainen, A. K. *Acta pædiat., Stockh.* 1948, **35**, suppl. 3, p. 125.
9. Bruns, P., Shields, L. *Amer. J. Obstet. Gynec.* 1954, **67**, 1224.

AUTO-IMMUNITY IN THYROID DISEASE

SIR,—The articles on the immunology of thyroid disease in your issue of Nov. 15 provide strong evidence that primary myxœdema and Hashimoto's thyroiditis are variants of the same fundamental process. It may therefore be of interest to report the results of an investigation into whether in primary myxœdema there are biochemical changes similar to those found in Hashimoto's thyroiditis.[1–3]

Estimations of the thymol turbidity and the serum-proteins have been carried out in 45 untreated hypothyroid subjects without goitres or evidence of liver disease. Abnormal results were found in 19 patients. The thymol turbidity was greater than 4 Maclagan units in 14 (31%) of cases and the total globulin exceeded 3·5 g. per 100 ml. in 14 (31%). The γ-globulin (estimated by paper electrophoresis) was over 1·5 g. per 100 ml. in 8 (24%) of 33 subjects investigated. In 9 (20%) there was abnormality of both the proteins and the thymol turbidity.

The precipitin test was positive in 9 (20%) and the complement-fixation test in 30 (67%). Of the 9 patients with a positive precipitin test only 3 had abnormal biochemical findings. On the other hand, 17 of the 19 abnormal results occurred in cases with a positive complement-fixation test.

These observations are in agreement with the findings of Dr. Roitt and Dr. Doniach, who showed that the precipitin and complement-fixation tests demonstrate separate immune systems. It would appear that in hypothyroidism the abnormal results of the biochemical tests reflect the antigen associated with the complement-fixation test, although they are obviously much less sensitive.

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Western Infirmary, Glasgow.

I. P. C. MURRAY.

SIR,—Your leading article of Nov. 15 invites comments on certain points. You state that in Dr. Roitt and Dr. Doniach's experiments "the Coons technique demonstrated that none of the administered antibody had in fact entered the thyroid". But this in point of fact could not be shown since the technique used was based on the identification and localisation of γ-globulin in a section of thyroid tissue. The results showed that the thyroid of the monkey which had been injected with the serum of a patient with Hashimoto's disease had a normal distribution of γ-globulin. Owing to the cross-reaction with monkey γ-globulin, the use of a fluorescein-labelled anti-human γ-globulin to determine complete absence of thyroid antibody was not possible.

Also, you apparently accept the fact that "delayed" type hypersensitivity has been demonstrated in humans with thyroid disease and refer to Buchanan et al.[4] But the findings were taken by these authors to indicate an

1. Luxton, R. W., Cooke, R. T. *Lancet*, 1956, ii, 105.
2. Skillern, P. G., Crile, G., McCullagh, E. P., Hazard, J. B., Lewis, L. A., Brown, H. *J. clin. Endocrin.* 1956, **16**, 35.
3. Doniach, D., Hudson, R. V. *Brit. med. J.* i, 672.
4. Buchanan, W. W., Anderson, J. R., Goudie, R. B., Gray, K. *Lancet*, 1958, ii, 928.

Arthus type of reaction and certainly did not conform with the usual results of tuberculin injection in sensitive subjects. Our own experience at The London Hospital, although as yet on a small scale, has provided no evidence of the presence in such patients of delayed-type skin reactions. This involved the injection of a dose of saline extract of the patient's own thyroid, standardised on the basis of an antigen titration in a complement-fixation reaction, into the skin of the forearm. This procedure was adopted, first, to avoid the transmission of hepatitis virus and, secondly, to eliminate irrelevant " transfusion reactions " unrelated to true auto-immunity. Tests in various thyroid diseases with circulating antibody resulted in erythema and œdema which were completely resolved in 24 hours and which bore little resemblance to delayed-type reactions.

Department of Bacteriology, The London Hospital, E.1.

C. F. BARWELL
R. G. WHITE.

SIR,—Your leading article ends on a prophetic note. While recognising the existence of " many unsolved problems " in the association of auto-immunity with thyroid disease, it concludes: " If they can be solved, it is likely that the new knowledge will be applicable to diseases of other organs."

One in particular comes to mind, and one reviewed in retrospect in your leader of Oct. 18—Crohn's disease. There is a striking similarity between the histological appearances of this chronic inflammatory lesion of the alimentary tract and Hashimoto's thyroiditis on which the pioneer work of Roitt, Doniach, and their colleagues has thrown so much new light. In both diseases there is the same development of multiple lymphoid aggregations and infiltration of the field with lymphocytes and plasma cells, the formation of new connective tissue, and the occasional presence of giant cells. As a clinician I am unaware of any existing serological studies in Crohn's disease, and this lesion seems to offer a rich field of investigation by the immunologist. If research disclosed a rise in the gamma-globulin levels it would lend support to the hypothesis that the histological features of Crohn's disease represent an immunological response to an unknown antigen, with its sequelæ of sensitisation and focal inflammation.

Dukinfield, Cheshire. F. G. RALPHS.

NEUROLOGICAL SYNDROMES ASSOCIATED WITH CARCINOMA

SIR,—Dr. Woolf's letter (Nov. 22) brings to my mind a case in which a syndrome taking the form of intense general pruritus began some time after the removal of a carcinomatous nodule and persisted, with short intervals, in spite of treatment until the patient's death by suicide.

A middle-aged woman of German Jewish family, a dressmaker, came to the German Hospital complaining of intense generalised pruritus, for which no treatment had been of any avail. She was of rather spare habit. She was admitted to hospital and her whole body was covered with pieces of lint, smeared with a mild boracic ointment, I think. Under this treatment the patient, resting in bed all the time, soon recovered and was able to leave the hospital.

However the terrible itching returned and she sought the advice of Dr. H. W. Barber at Guy's Hospital. I should here mention that I had seen a microscopical section of the carcinomatous lymph-gland which had been removed from near one clavicle. The X-ray treatment after the operation had left scarring—an X-ray burn. Dr. Barber treated the patient by malarial inoculation. Temporary improvement resulted, but the generalised itching returned. The patient said she would rather die than undergo malarial inoculation again.

Visiting hospitals as an outpatient she collected enough barbiturates for a single fatal dose and with this she committed suicide. A well-known pathologist said at the inquest that he could find no other disease than the skin trouble and pronounced this to be the cause of the suicide.

London, N.W.1. F. PARKES WEBER.

A CORONARY PARADOX

SIR,—Concerning the points of view you cite in your annotation of Nov. 1, I wonder whether there is any fact against the hypothesis that the number of mast cells could increase locally as a reaction to an injury or to any other pathological state of the vessel wall at that place. The increase in heparin production might then not always be sufficient to prevent thrombosis. Could this perhaps explain the discordance between the findings you mention?

Amsterdam. L. M. DALDERUP.

BANTING UP TO DATE

SIR,—I was heartened at the outset of this timely correspondence by Dr. Mackarness' reminder of the need, in grappling with the complexity of the problem, for an occasional glance beyond the laboratory bench—even to the realms of social medicine!

Following the Central Health Services Council report on antenatal care related to toxæmia, local health authorities are encouraged to greater activity in the matter of health education of the expectant mother. In this connection, the importance of weight control requires no emphasis. The observations of Professor Nixon [1] and Dr. Hamlin [2] indicate that the villain of the piece is carbohydrate, whilst Hipsley [3] demonstrated that the fibre and bran elements of unrefined carbohydrates can prevent toxæmia, which tallies with the big diminution in the incidence and severity of toxæmia during the German occupation of Holland in the last war and its increase following the liberation.

Whilst obesity during pregnancy is of greater public-health significance than obesity in the community at large, it would appear that in the matter of prevention and treatment the crux of the matter is, as pointed out by Surgeon Captain Cleave (Nov. 22), excess of refined carbohydrate, which opinion is evidently shared by Dr. Mackarness (Nov. 15).

Being concerned with other suspected damaging influences arising from the consumption of the refined carbohydrates, I am more interested in the measure of agreement reached in this correspondence than in the disagreement which persists regarding the quantity and type of fat which may safely be consumed in lieu of carbohydrate. Indeed, experience suggests that if the reduced amount of carbohydrate is taken in the whole-grain form there is less liability for increased fat to be demanded to satisfy the appetite.

Finally, I would remind Major Hamilton that one of the best surveys of the natural man in recent times was undertaken by Dr. Weston Price.[4] His photographic records of communities—Polynesians, Melanesians, Gaelics, Alaskan Eskimos, aborigines, Africans, and others—which had remained isolated from the trade routes of modern commerce show that they were very far from being the diseased specimens which Major Hamilton suggests. They were of fine physique with magnificent teeth and dental arches. Dr. Price found plenty of diseased specimens among natives of the same race who had access to the refined sophisticated carbohydrate and processed food of Western commerce.

1. Nixon, W. C. W. *Postgrad. med. J.* 1956, **31**, 266.
2. Hamlin, R. H. S. *Proc. R. Soc. Med.* 1953, **46**, 393.
3. Hispley, E. H. *Brit. med. J.* 1953, ii, 420.
4. Price, W. A. Nutrition and Physical Degeneration. Los Angeles, 1945.

To endeavour to bring these lessons home, as Surgeon Captain Cleave and others do, and to advocate the maximum practicable wholeness and freshness of the daily diet compatible with a civilised existence is very far from worshipping Major Hamilton's false god of naturalism.

Health and Welfare Services Department, Eastbourne. KENNETH O. A. VICKERY Medical Officer of Health.

WILSON'S DISEASE

SIR,—In your annotation of Nov. 1 you state, with reference to treatment, that "it is difficult to see what might be gained by raising the level of cæruloplasmin artificially; but this certainly should be tried". May we call attention to the results of such a trial in which the effect of artificial elevation of cæruloplasmin was investigated with respect to the absorption of ^{64}Cu?[1]

In this study the absorption of 2·3 mg. of radioactively labelled copper, orally administered as ^{64}Cu acetate, was measured in each of two experiments, two weeks apart, in a patient with Wilson's disease. Before the second experiment the patient's serum-cæruloplasmin concentration, which was less than 1 mg. per 100 ml., was raised to a normal level of 25 mg. per 100 ml. by the intravenous administration of 1·35 g. of purified cæruloplasmin. In both experiments the concentration of ^{64}Cu in serum rose sharply, to the same degree, and then fell, and in both experiments 42% of the adminstered ^{64}Cu was recovered in stools and urine over a four-day period.

These results suggested that "exogenous cæruloplasmin does not alter the manner or amount of copper absorption in patients with Wilson's disease". It is widely believed that excessive net copper absorption, followed by copper deposition and damage to tissues, is a fundamental disorder in Wilson's disease. Our findings indicate that the exogenous increase of serum-cæruloplasmin will not favourably alter the abnormalities of copper absorption in this illness.

IRMIN STERNLIEB
Albert Einstein College of Medicine, Bronx Municipal Hospital Center, New York, N.Y. ANATOL G. MORELL
I. HERBERT SCHEINBERG

INSECTICIDAL AEROSOLS

SIR,—Continuous-flow heat-volatilised insecticidal aerosols have been used in this country since 1946, and are now widely installed in houses, shops, cinemas, hotel kitchens, food and other stores, and agriculture buildings. Fears that there might be a toxic hazard associated with their use were expressed in 1955.[2] Whitfield,[3] however, emphasised that these fears were based upon American experience, and need not arise in connection with the aerosols in use here.

So far as we could ascertain, however, there was inadequate information about the measured exposure of human subjects or experimental animals to these aerosols, and over a period of 12 months records were maintained of the output of dicophane (D.D.T.)/lindane mixtures, aldrin, or azoxybenzene from units installed in five animal laboratories. Our results have been prepared for publication elsewhere,[4] but a brief summary of certain of the conclusions may be of interest.

There is a range of doses of the dicophane/lindane in which it appears possible to combine effective fly control with safe operation. The upper limit of this range is estimated to lie between 0·53 and 0·75 g.d.t. (g. per day per 1000 c. ft.) for budgerigars and perhaps for mice, although the latter have probably a higher degree of tolerance. The upper limit for dogs lies above 0·22 g.d.t.; for rats, above 0·53 g.d.t.; and for human beings above 0·75 g.d.t. when exposed intermittently for a total of at least 206 hours.

From the unexpected uniformity of some of the biological effects, a buffering action of the surface deposit upon the aerial concentration of lindane may be postulated, and a possible mechanism has been suggested.

Budgerigars appear to be unusually susceptible to lindane, and from the accumulation of this material upon their feathers it seems probable that the habit of "preening" leads to a high oral intake. By contrast, mouse fur has been found to be practically free from deposited lindane.

Vaporised aldrin at 0·50 g.d.t. and azoxybenzene at 0·43 g.d.t., as used to control horticultural pests, did not appear during our observations to offer any toxic hazard to man, budgerigars, mice, hamsters, or guineapigs.

A. HOWARD BAKER
Avebury Research Laboratories, Goring-on-Thames. G. F. H. WHITNEY.
Nutritional Research Unit, Huntingdon. ALASTAIR N. WORDEN.

BREAST CANCER

SIR,—I was pleased to read Professor McWhirter's temperate and lucid paper on breast cancer (Nov. 15) in reply to the two rather unusual publications from the Mayo Clinic.[1 2] To many British readers it must seem surprising that members of the staff of so famous a clinic should argue as they do from such strangely selected statistics. It is even more surprising to learn that Dr. Berkson and his colleagues regard it as a "chore" (to use their own expression) to follow up the inoperable cases.

The Mayo Clinic workers chide McWhirter for not having initiated a controlled clinical trial of simple and radical mastectomy, but McWhirter has now explained why a controlled trial was not practicable at a time when he himself advocated it. Perhaps the Mayo Clinic would now tell us how many of their cases fall into the "locally advanced" and "distant metastases" groups. Without such information their papers on radical mastectomy tell us no more than has already been learnt from hundreds of similar papers published all over the world.

To conduct a controlled clinical trial, consigning alternate cases to two treatment groups, is far easier said than done, though such investigations are, I understand, now being conducted. However, even in the absence of statistics from a planned research of this kind there are at least two retrospective researches on contemporaneous series of cases treated by radical and more simple surgery. The first deals with 1044 new cases of breast cancer seen at St. Bartholomew's Hospital during the period 1930–39 inclusive.[3] The second compares the results of simple and radical mastectomy in 1046 *operable* cases of breast cancer treated in the west Hampshire area between 1946 and 1954.[4] The St. Bartholomew's series shows that there was virtually no difference in the survival-rates after simple and radical surgery, despite the fact that 55% of the simple group had no more than a local excision of the tumour; the incidence of morbidity, such as œdema of the arm, was substantially lower in the simple-surgery group, but valid conclusions on the local-recurrence rate were made difficult by the large number of cases treated by local excision.

The Hampshire series compares radical and simple surgery, but the latter group does not appear to include cases treated by local excision, such as appeared in the Barts series. The results were discussed in a privately published review by Dr. A. G. C.

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Taylor, radiotherapist to the Southampton area, who came to the following conclusions:

(*a*) The five-year survival-rate is at least 13% better in the simple surgery group, and this is not explained by age differences in the two groups.

(*b*) The incidence of local recurrence was low and similar in the two groups.

(*c*) The incidence of distant metastases was higher in the radical group.

Dr. Taylor's series seems to present a more promising picture of simple mastectomy than has appeared in other series; but, whatever differences may emerge from a comparison of simple and radical surgery in different places, it is at least abundantly plain that simple mastectomy gives no lower survival-rate, is less mutilating, and has a wider application than radical surgery. In the face of so many carefully assembled statistics it does seem surprising that such prejudice can still be exhibited against a method taught and practised some thirty years ago by Sir Geoffrey Keynes, and so ably advocated by Professor McWhirter in recent years. Though the tide of surgical opinion is slowly changing there still seem to be too many institutions in which hardy conservatism and Halsted-worship compel rigid adherence to the time-honoured (though possibly time-expired) operation of radical mastectomy.

After so many years of hard work it does seem a great pity that the Mayo Clinic workers are not in a position to give us a better picture of the problem of breast cancer, instead of harping upon such a well-worn and unproductive theme.

Radlett, Herts. REGINALD S. MURLEY.

SKIN FRAGMENTS REMOVED BY INJECTION NEEDLES

SIR,—The surprisingly high incidence of "coring" of skin fragments by needles reported by Mr. Gibson and Dr. Norris in your issue of Nov. 8 may account for contamination with skin staphylococci of 2% of blood collected for transfusion.[1]

In view of these findings it is surely no longer defensible to insert an open-ended needle through intact skin into the spinal theca, the epidural space, or the synovial cavity of a joint.

Southampton General Hospital, Southampton. P. J. HORSEY.

HYPOTHERMIA, HYPERPYREXIA, POLIOMYELITIS, AND ENCEPHALITIS

SIR,—You have lately published two interesting contributions [2 3] on this subject. Systemic hypothermia has been of considerable use in selected children with the hyperpyrexia syndrome and in encephalitis of diverse ætiology.

Thus, the hyperpyrexia syndrome of polioencephalitis may of itself be lethal unless promptly reversed; hypothermia for this condition has been used on my service since 1950 and was referred to in a talk before the American Medical Association in 1953.[4] The youngest polioencephalitis patient (type-1 virus) so managed was 9 months old and had a temperature of 109°F. There is a considerable economy of oxygen and insensible water-loss during systemic hypothermia which has been useful in various conditions (e.g., the viral forms of encephalitis, lead encephalopathy, salicylism). The longest period of time systemic hypothermia has been successfully applied—for its effect primarily on ventilation in this case—was in a $2^1/_2$-year-old boy with severe bulbospinal poliomyelitis whose ventilatory insufficiency was not completely overcome with assisted positive pressure. He was maintained at an average body temperature of 88°F for six weeks [5]; this child, whose extremities are now moderately disabled from poliomyelitis, has recently entered school at the age of 6, has no intellectual impairment, and requires no ventilatory assistance. Johnston et al.[1] have referred to the use of hypothermia in neurosurgical procedures and in head injuries.

It need hardly be said that such a therapeutic measure should not be undertaken lightly; but when indicated it should be instituted swiftly and under circumstances permitting of close constant supervision.

Department of Pediatrics, University of Louisville, Kentucky. ALEX J. STEIGMAN.

ANASTOMOSIS IN THE CORONARY CIRCULATION

Sir—My interest in the recent papers of Dr. Laurie and Dr. Woods [6 7] prompts me to draw attention to some of my preliminary unpublished findings on the anastomosis in the coronary circulation.

Their statement [6] that "the serious effects of atherosclerosis are seen in . . . the heart (coronary-artery disease)" has not gone unchallenged,[8 9] and is certainly at variance with our own findings [10] and those of other pathologists in this country.

Their conclusions [7] about the incidence of anastomosis again differ from those of the pioneers in this field [11]—that is, of those who have used the same technique. In spite of the fact that their material consists only of Bantu hearts, they state that the "majority of healthy people over the age of 4 years have functionally important coronary anastomosis", implying that the results are applicable to Europeans as well. This is not correct.

My own interest in this subject was stimulated by the article of Brink,[12] which Dr. Laurie and Dr. Woods seem to have overlooked.

The material investigated so far consists of 65 Bantu hearts (ages $2\frac{1}{2}$ to 99 years) and 32 European hearts (ages 3 to 80 years). Injection was done according to Schlesinger's latest specifications, with the modification that the left coronary artery was first perfused with the radiopaque mass for a period of three minutes and subsequently by the right coronary artery. These injections were done under a pressure corresponding to that of the mean blood-pressure of the individual.

In the European group, 21 of the 32 cases showed no communications of arteriolar size, and in the Bantu group 14 of the 66 cases showed no communications.

Although this is a very small series, it does indicate a striking difference in the coronary anastomosis patterns of Bantu and European.

We certainly agree with the findings of Dr. Woods and Dr. Laurie that a large percentage of the Bantu do have coronary anastomosis of functional significance, but this does not apply to Europeans.

Is this racial difference in the coronary anastomosis blood-supply not perhaps one of the many reasons why the Bantu so seldom suffer from the severe effects of atherosclerosis such as coronary thrombosis and myocardial ischæmia?

Institute for Pathology, Pretoria, South Africa. W. J. PEPLER.

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SUBARACHNOID INJECTION OF CARBOLIC ACID

SIR,—I am most grateful to you for drawing attention to an error in the reference to Dr. R. M. Maher's work in my paper of Nov. 8. The use of the carbolic-acid solution reported in my article is a direct result of the paper [1] by Dr. Maher published in 1957. By a mishap my article referred only to Dr. Maher's 1955 work. This approach to the problem has undoubtedly provided a relatively simple means of managing intractable pain in carcinoma.

The Royal Infirmary, Edinburgh. ALLAN S. BROWN.

*** In the form in which it reached us Dr. Brown's paper referred in the text to Dr. Maher's 1957 article, but in the list of references the date was 1955. An attempt to correct this discrepancy led to the unfortunate consequence which both he and we regret.—ED. L.

EPIDURAL INJECTION OF CARBOLIC ACID IN INCURABLE CANCER

SIR,—In his first report on the relief of pain in incurable cancer, Maher [2] described his technique for intrathecal injection of 1/20 phenol in glycerin or 'Myodil'. In subsequent reports [3 4] he mentioned the use of epidural injection of 1/15–1/10 phenol in glycerin or myodil to supplement the intrathecal injection. Dr. Brown, in his paper of Nov. 8, concentrates on the subarachnoid technique and mentions that epidural injection has never succeeded where subarachnoid injection has failed.

With the change in climate of opinion away from intrathecal and towards epidural anæsthesia in recent years [5], it was decided to investigate the use of epidural phenol in glycerin without simultaneous use of intrathecal phenol in glycerin. Four patients are reported here, treated with 1/10 phenol in glycerin epidurally, using a slight modification of Maher's technique. [4] The patients lay on their sides, with a 30° foot-down tilt, and the epidural space was identified by the "loss of resistance" test using a Tuohy needle. At L4-5 interspace 3 ml. of 1/10 phenol in glycerin was injected, the dural sac being simultaneously collapsed by intrathecal puncture at L1–2 interspace. The patients were then slowly turned on to their backs and kept still for an hour. In two of these patients pain disappeared completely, while in the third and fourth there has been some improvement.

CASE 1.—Woman of 59. Cancer of the cervix, treated with radium, spreading in the pelvis and producing severe leg pain making it impossible to sleep without morphine. Two epidural injections were given on Feb. 13 and Feb. 20, 1958, resulting in complete relief of pain up till the patient's death on March 2.

CASE 2.—Man of 82. Inoperable cancer of the sigmoid colon invading the pelvis. Severe pain in the sacrum and coccyx entirely resistant to morphine. Epidural injection on Oct. 20, 1958, abolished pain completely.

CASE 3.—Man of 60. Cancer of the prostate, treated by prostatectomy and later orchidectomy, with severe pelvic pain. Epidural injection on June 3, 1958, partly relieved further pain until his death on Aug. 10.

CASE 4.—Man of 65. Cancer of the rectum, treated by abdominoperineal excision and later local excision for perineal metastases. Severe residual pain in the perineum. Epidural injection on June 2, 1958, produced no noteworthy improvement, though the patient's doctor reports some improvement after the patient's discharge from hospital.

It is suggested that the epidural approach may be of value when injecting phenol in glycerin for the relief of pain in incurable cancer.

Östersund, Sweden. BASIL FINER.

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STAPHYLOCOCCAL INFECTION IN MATERNITY HOSPITALS

SIR,—In view of the communications you have recently published on this subject, I think it is relevant to report a limited outbreak of phage-type-80 staphylococcal infection in Perivale Maternity Hospital, a 52-bedded unit in Greenford, Middlesex.

In November, 1957, four patients developed bad breast abscesses which failed to respond to treatment with penicillin instituted immediately. The onset was acute and all the patients were very ill. The abscesses spread from segment to segment of the breast, and in every case drainage of the abscesses had to be repeated on several occasions. In addition, one baby had a severe suppurative infection of the lacrimal duct, which required incision and drainage. The organism isolated from all these cases was a coagulase-positive *Staphylococcus aureus*, sensitive only to chloramphenicol and erythromycin. The organisms were later identified as phage-type 80. These cases occurred within ten days of each other. A common source of the pathogens was not found.

At the onset of infection mothers and babies were isolated in cubicles and barrier-nursed. The whole of the hospital staff (about 50 persons) was swabbed on three separate occasions, and as a result 6 pupil midwives were found to be nasal carriers of type-80 staphylococci. The carriers were sent away from the hospital with topical treatment, and they were not allowed to return to work until two consecutive nasal swabs had been negative. The cubicles and one six-bedded ward, which had housed the infected patients, were fumigated with a 10% formalin spray. But following this the virulent organisms were still to be found in the rooms, and especially on the light switches and in the dust on the bed wheels. The affected rooms and their furniture were therefore washed down thoroughly with domiphen bromide ('Bradosol') 1 in 500, and subsequent bacteriological investigations failed to isolate type-80 staphylococci. All linen and blankets were soaked for 24 hours in 1 in 1000 domiphen before being sent to the laundry.

This small-scale epidemic confirms the observations of Dr. Timbury and her colleagues (Nov. 22) regarding the virulence of type-80 staphylococcal infections. And it also confirms the relatively low incidence of carriers amongst the staff. I believe that the small number of patients who became infected in this hospital was attributable to prompt isolation of infected cases (mother and baby being treated as a unit) with adequate barrier nursing, and also to the fact that the affected wards were not used again until the responsible organism had been eradicated. But the difficulties encountered in disinfecting rooms and furniture are especially noteworthy. Eleven beds were closed for 14 days and since then no further cases of infection with this organism have occurred. I think that it is possible by taking prompt and stern measures at the first sign of an outbreak of virulent staphylococcal infection to limit its spread and perhaps avoid closing the whole of a unit.

St. Thomas's Hospital, London, S.E.1. PETER J. HUNTINGFORD.

SIR,—Dr. Gillespie and his colleagues (Nov. 22) recommend disinfection of infants' blankets and garments, the use of a disinfectant hand-cream by nurses, and the application of 'Ster-Zac' powder to the newborn's umbilicus. Dr. Timbury and her co-authors record a victory for type-80 staphylococci in a maternity hospital. Your leader rebukes the careless user of antibiotics in

hospitals, and you are clearly determined to do what you can to influence professional (and public) opinion in the direction of preventing these serious outbreaks. There is nothing wrong in asepsis as such; there are, however, good and bad varieties of asepsis. No doubt it is bad asepsis that has aroused your justifiable wrath.

Jellard [1] applied triple dye to the umbilicus with encouraging results. Gillespie [2] found that the prophylactic application of antiseptic ointment to the anterior nares of adult inpatients prevented nasal carriage of staphylococci; and he suggests that this treatment might be extended to infants. It would seem an advantage to treat the anterior nares of all newborn infants in this way, perhaps renewing the application every time the baby is bathed.

Strictures on the sterilisation of bedding and clothing seem to be quite unjustified; it is significant that pillows and mattresses are nowhere mentioned. Disinfection of bedding, leaving out pillows and mattresses, is quite useless, and may be responsible for the bad results described. It is very clear that much cross-infection is due to hand-borne organisms. Gloves for nurses [3] seem to be the remedy.

The recommendations of Prof. Rocke Robertson (all eighteen of them), set out in your annotation of Nov. 22 (p. 1110), should be taken to heart by all responsible for patients in hospitals. Your leader sounds rather pessimistic: truly, the battle for improvement is long and hard, the opposition is very stiff, but enlightenment already exists in some quarters and will gradually spread; and even public interest may be aroused.

Epping. FRANK MARSH.

STAPHYLOCOCCAL DIARRHŒA

SIR,—During the 1914–18 war and for several years after it, staphylococcal infection in wounds, and as boils and carbuncles, was extremely common. At that time in the laboratory of the Charterhouse Rheumatism Clinic a stock of staphylococcal bacteriophage was at hand for treating the infection. It was given by mouth on an empty stomach (a tablespoon of the phage broth with a grain or two of sodium bicarbonate in a little water). This was immediately followed by a glass of cold water to encourage a quick passage through the pylorus before the acid destroyed the phage. Phage by mouth generally cured even longstanding infection.

Now that the exact phage type of staphylococci can be determined, and presumably obtained, the effect in staphylococcal diarrhœa might well be even more successful. Judging by Mr. Webster's experience described in your issue of Nov. 15, when 5 out of 8 patients died, it is surely worth trying this very simple method.

London, W.1. H. WARREN CROWE.

SODIUM AND POTASSIUM IN NORMAL AND PRE-ECLAMPTIC PREGNANCY

SIR,—I was most interested in the paper by Dr. MacGillivray and Dr. Buchanan (Nov. 22) on sodium and potassium in pregnancy, but was surprised to read that they found it difficult to reconcile their findings with my "claim that increased intake of salt during pregnancy will prevent or cure pre-eclampsia". Earlier in their paper they state that "the decrease of body-sodium per kilogramme in pre-eclampsia compared with late normotensive pregnancy is statistically significant". If this is true, then giving extra salt to pre-eclamptic patients should increase the body sodium, and so bring it to the level of the normotensive pregnancy, and presumably cure the pre-eclampsia.

Public Health Department, Derby. MARGARET ROBINSON.

CHILDREN IN HOSPITAL

SIR,—Surely Miss Stephen and Dr. Whatley (Nov. 22) do not believe that this unit sponsored my film *A Two-year-old Goes to Hospital* without considerable preliminary experience of the behaviour of young children in hospitals and other institutions?

The film is an objective study of one child and is not offered as proof of a hypothesis. But our view that the behaviour shown is a very common response to separation from the mother consequent upon admission to hospital is supported by many observers in different countries—including Faust,[1] Godfrey,[2] Illingworth,[3] Prugh,[4] and others whose work is referred to in my recent book.[5]

Furthermore, there is ample evidence that if separation is avoided by admitting young child and mother to hospital together, such distressed behaviour is greatly diminished. This is illustrated in my new film *Going to Hospital With Mother*, which will shortly be shown to the Pædiatric Section of the Royal Society of Medicine.

The Tavistock Institute of Human Relations, London, W.1. JAMES ROBERTSON.

SEARCH FOR ABNORMAL HÆMOGLOBINS IN ORIENTAL JEWS

SIR,—A search for abnormal hæmoglobins has been carried out among Oriental Jews, with a view to the ethnic and anthropological definition of our population. Cooley's trait and full-blown thalassæmia [6–9] as well as elliptocytosis [10] and an increased red-cell susceptibility to hæmolysis accompanied by a reduced glutathione content [11 12] have been found among Oriental Jews previously.

We have now examined hæmoglobin samples taken from 397 Oriental and Sephardi Jews (137 men and 260 women) by the standard technique of hæmoglobin paper electrophoresis.[12]

The patients' countries of origin were as follows:

Iraq	100	Kurdistan	18
Morocco	78	North Africa	15
Sephardi Jews born in Israel	49	Syria	11
Turkey	41	India	5
Yemen	39	Afghanistan	1
Persia	39	Cochin	1

No hæmoglobin electrophoretically different from hæmoglobin A was found. There was one apparent exception: a small slower-moving hæmoglobin fraction, apart from hæmoglobin A, was found in a woman with severe macrocytic anæmia. When she recovered she showed only hæmoglobin A. The additional fraction had been, most probably, hæmoglobin F and clearly did not represent a genetically determined anomaly.

Consequently, abnormal hæmoglobins, as defined by paper electrophoresis, either do not occur or must be rare among Oriental Jews in Israel.

We are grateful to the Hematology Research Foundation in Chicago for enabling us to carry out this work.

Department of Medicine A and Laboratory of Clinical Investigation, Rothschild-Hadassah University Hospital, and the Hebrew University-Hadassah Medical School, Jerusalem, Israel. F. DREYFUSS, J. PINKHAS.

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LIVER IN NORMAL PREGNANCY, PRE-ECLAMPSIA, AND ECLAMPSIA

SIR,—Dr. Antia and his colleagues (Oct. 11) state that exudation in the space of Disse does not seem to be an artefact or agonal change. Their fig. 2 is given apparently to substantiate this.

I believe that this photograph was taken from a post-mortem specimen of the liver, and I note that under Materials and Methods the authors mention that in two cases tissues were obtained immediately after death. Among many hundreds of biopsies I have never encountered the picture given in fig. 2 except in postmortem material; so I believe that it is important that this should be explicitly stated when it is the case. Otherwise, the photograph in combination with the text may mislead some readers.

Department of Pathology,
University College of the West Indies,
Mona, St. Andrew, Jamaica. G. BRAS.

DIAMO-DIPHENYL SULPHOXIDE IN DERMATITIS HERPETIFORMIS

SIR,—Diamino-diphenyl sulphoxide (D.D.S.O.) has recently been introduced as an alternative to dapsone (diamino-diphenyl sulphone) in the treatment of leprosy. It is said to be almost as effective as dapsone in that disease and to cause less side-effects—notably, less adverse effects on the blood. Since dapsone is now recognised as probably the best available treatment for dermatitis herpetiformis it seemed that a trial with D.D.S.O. in this very troublesome condition was warranted.

12 patients were treated. All but 2 of these had been successfully controlled with dapsone for periods varying from two to four and a half years. The other two were a child in whom control was only achieved by a combination of liq. arsenicalis and local hydrocortisone and a patient who had not had any treatment. 1 patient failed to report back. The results of treatment in 11 cases are shown in the accompanying table.

Control of the condition (i.e., disappearance of lesions and relief of itch) was achieved in 5 cases. The controlling dose varied from 50 mg. to 200 mg. daily. In the remaining 6 cases the beneficial effects were slight or nil. D.D.S.O. was considerably slower in controlling the disease than dapsone.

The important feature of this small trial is the toxicity of the drug. Only 2 out of the 11 patients showed no evidence of upset. Urinary symptoms and signs of varying severity were present in the other 9. The symptoms appeared to be proportional to the dosage. In case 2, for example, the dosage was altered after four days to 100 mg. on alternate days and the symptoms were aggravated shortly after each dose of 100 mg. Case 5, on the other hand, developed symptoms only after fourteen days and they continued in spite of a lowered dose. Because of the frequency and severity of urinary symptoms, investigations into the cause have necessarily been scanty; but in several patients the urine was bacteriologically examined before and after treatment and the development of a *Escherichia coli* infection (such as has been reported with dapsone)[1] cannot be blamed. Crystalluria was not found.

Davey et al.,[2] in treating leprosy in 24 patients over a period of fifteen months, gave 100 mg. of D.D.S.O. daily, and 18 patients received the drug for a year or longer. The drug was apparently well tolerated by both children and adults. There was a slight fall in hæmoglobin in 13 patients, with spontaneous recovery, and also a slight temporary leucopenia. No other toxic signs were observed. The general health of leprosy patients is not nearly so good as that of patients with dermatitis herpetiformis and toxic symptoms would therefore be more likely. It is surprising that these urinary symptoms have not previously been reported.

This trial indicates that D.D.S.O. is not a suitable drug for the treatment of dermatitis herpetiformis and suggests that it should be used in leprosy only with great care.

A supply of tablets was kindly provided by I.C.I. Pharmaceuticals Ltd.

Department of Dermatology,
Glasgow Royal Infirmary. J. O'D. ALEXANDER.

AN INJECTION UNIT INSTEAD OF THE HYPODERMIC SYRINGE

SIR,—It is true that those solutions for injection which are nowadays put up in ampoules of standard dosage could equally well be packed in the 'Ampin' device described by Mr. Flood (Nov. 22, p. 1114). The device is not so useful for those injections which are administered in varying dosage or which need to be given slowly over a long period—for example, insulin. Patients undergoing stabilisation may require frequent change of dose or strength. Again, the anæsthetists require a more flexible form of dosage than can be provided by the ampin system.

To meet all the dosages and strengths required in hospital practice the variety of ampins would have to be very large. It therefore seems unlikely that ampins will entirely replace the use of syringes in hospitals, though they have many advantages for users in general practice.

It is worth noting, however, that the cost of using ampins is considerably higher than that of using syringes and needles.

Mr. Flood suggests that the costings I published in 1956 are low and offers an explanation which unfortunately does not fit the facts.

In 1956 the service had already been in operation for $2^1/_2$ years, so that an initial supply of new syringes could not be an important factor.

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Case	Age	Sex	Daily dosage (mg.)	Duration of treatment (days)	Effect on skin condition	Onset (days)	Toxic effects		
							Symptoms	Duration after withdrawal of drug (days)	Urine
1	55	M	50	14	Controlled	—	—	—	*Esch. coli*•
2	51	M	50–100	14	Controlled by 100 mg.	2–3	F, D, burning sensation in penis	2	—
3	66	M	50	14	Slight benefit	2	F (slight)	1–2	*Staph. aureus*•,
4	10	F	75–100	42	Slight benefit	—	F (slight)	—	*Esch. coli*, few red cells
5	52	M	100–50	28	Controlled by 100 mg.	14	D	1–2	—
6	66	M	100	14	Nil	—	F (slight)	—	—
7	47	F	100	14	Controlled	2	F, D, pain in back	3	—
8	66	M	150–200	5	Slight benefit	3	F, D, H, all severe	4	Blood
9	41	F	200	14	Controlled after 1 week	—	—	—	—
10	30	M	150	14	Slight benefit	2	H	—	Blood
11	53	M	100–200	21	Nil	—	F	—	—

• Before treatment. F = frequency of micturition. D = dysuria. H = hæmaturia.

More recently we have improved our methods, with the result that output has increased to about 1100 syringes a day and the staff has been reduced to three. Our latest costing, which includes wages, salaries, replacements, heating, lighting, rental, and depreciation of plant comes to 3·3*d.* per syringe and needle put into the nurse's hand. This does not include the distribution cost in the hospital, since distribution is not undertaken by my staff. If, however, distribution were undertaken by us, this, we estimate, would increase the cost from 3·3*d.* to 3·7*d.*

Since some syringes will always be necessary, and since it is agreed that a central sterilising service is the best way of ensuring their sterility, it is not easy to show, as Mr. Flood seeks to in his conclusion, that ampins would yield any saving in time and money, though they may well be a great convenience in certain circumstances.

Westminster Hospital, London, S.W.1. HERBERT S. GRAINGER Chief Pharmacist.

INTRA-ARTICULAR THERAPY IN RHEUMATOID ARTHRITIS

SIR,—It is important to ensure proper physical treatment and strict avoidance of overexertion of a weight-bearing joint into which hydrocortisone is being injected. Otherwise, clinical improvement will be very short and radiological deterioration may sometimes be seen within a short time.

May I suggest to Dr. Chandler and Dr. Wright (Sept. 27) that they examine and re-examine the knee-joints of those patients who in addition to intra-articular therapy got the following accepted treatment:

(1) Individual resistive exercise of the thigh muscles.

(2) Correct bandaging or splinting of the knees during the day for months.

(3) Instruction in reasonable daily living habits which affect the knees, including movement patterns, posture at work, and degree of activity.

Institute of Physical Medicine, Municipal Hospital, Hadassah, Tel-Aviv, Israel. H. I. WEISER.

TRAINING IN PSYCHOTHERAPY

Dr. NOEL HARRIS, chairman of the education committee of the Royal Medico-Psychological Association, writes:

"The Association would be grateful if you could draw your readers' attention to a training scheme initiated by them in 1957. The scheme provides training in psychotherapy especially for the younger psychiatrists working in the provinces as well as in London. The aim is to provide training in short-term methods of psychotherapy rather than in prolonged deep analytical treatment.

"At present the scheme is being run on a voluntary basis so that neither tutors nor students are paid or charged fees. Further particulars may be had from the Secretary, R.M.P.A., 11, Chandos Street, Cavendish Square, London, W.1."

ANABOLIC STEROIDS

IN our issue of Nov. 15 Messrs. Searle challenged the statement in our leader of Oct. 25 that the cost of a week's treatment with their product 'Nilevar' (norethandrolone) may amount to £4 or more. Our estimate was based on a recommended adult dosage of 30–50 mg. daily, as given in the manufacturers' reference manual no. 4. Messrs. Searle point out that in September they announced their revision of the recommended dose, which is now 20–30 mg. daily. The weekly cost of 30 mg. a day is:

	Cost at Hospital List Price	*Less 5%**	*Less 7½%**	*Less 12½%**
From bottle of 25 tablets	48*s.* 5*d.*	46*s.*	44*s.* 9½*d.*	42*s.* 4½*d.*
" " " 50 "	—	43*s.* 6½*d.*	42*s.* 4½*d.*	40*s.* 1*d.*
" " " 250 "	—	—	—	37*s.* 1*d.*

* For larger orders.

THE INTEGRITY OF SURGICAL GLOVES

Mr. C. C. YATES, manager, The London Hospital (Ligature Department) Ltd., writes:

"To prevent any misunderstanding which might arise from the publication of the article on this subject in your issue of Nov. 15, The London Hospital (Ligature Department) Ltd. would like it to be known that the manufacture of the apparatus described has been protected by application for a patent. The device is not yet generally available for sale; but, as soon as it is, this fact will be advertised."

Parliament

How Many of Us Should There Be?

ON Nov. 20 in the House of Lords the Earl of ALBEMARLE drew attention to the third report of the Migration Board, and asked the Government whether they had instituted research to discover how soon this country was likely to reach the optimum population to match resources of water, farm land, and housing. The official figures for immigration and emigration were admittedly inadequate, and he submitted that we did not know whether our basic and essential resources were likely to match our slowly increasing population. He was also uneasy about the balance of emigration and immigration. Though numerically the presumed balance in loss of population was small—probably 27,000—most of our new entrants in earning-power, education, or financial standing did not match the people we had lost. Because of the burdens being borne by our population and welfare funds he asked for a temporary cessation of immigration and an examination of the situation. In a scientific age we must adopt a less happy-go-lucky attitude towards the implication of free entry for all comers.

Lord TAYLOR, in a maiden speech, said that in considering the balance of our population he was impressed, not by the small loss by migration, but by total growth of our population. From 1952 to 1956 it had increased by 512,000. Allowing for losses by migration and death this meant that we had produced 701,000 children. As a member of the Harlow Development Corporation he had been impressed by the birth-rate of that new town—32 births per 1000 of the population compared with the national rate of 16 per 1000. He believed that this showed that given the right environment English people preferred to have large families. He did not regard this as a cause for alarm but for rejoicing. But he agreed that existing statistics were inadequate and he would like to see set up a Social Research Council—analogous to the excellent Medical Research Council—which would initiate research and long-term social thinking. Effective legislation and administration depended not only on knowing current views, but also on understanding future probabilities. We could obtain this information only by more research into the facts of human behaviour and our relations to our own natural and man-made environment.

Earl WALDEGRAVE, replying for the Government, said that what our optimum population might be was still debatable, but the Government had no evidence that the pressure on our available resources had reached a dangerous degree. Water-supplies were ample to match the increased development of land and housing so long as the requisite capital expenditure was forthcoming.

Medical Advertisements

On Nov. 21 Mr. FRANCIS NOEL-BAKER asked the Government to appoint a Royal Commission on advertising. He suggested that advertising was now so powerful, complex, and controversial, its impact on each man, woman, and child so great, and some of its methods so doubtful that an independent and impartial inquiry was desirable.

An important part of his speech dealt with methods of advertising so-called health foods, toothpastes, drugs, and patent medicines. The health of the nation, he suggested, was

being endangered by wildly dishonest claims made by the manufacturers of these products. He cited examples of exaggerated claims for the vitamin content of a food product, of sugar and coloured water sold at an inflated price as a medically useful glucose drink, of unfounded claims for the slimming powers of a proprietary health bread and for the antibacterial properties of two brands of toothpaste. In the opinion of many doctors the sale of three widely advertised tranquillisers should be forbidden except on a doctor's prescription. He spoke with respect of a large group of national newspapers which had, on the advice of its own medical adviser, banned these products from its advertisement columns. He also drew attention to the extraordinary situation about tobacco advertising. Though the Government agreed that a direct connection existed between cancer and cigarette smoking little publicity was given to their attitude, tobacco companies continued to advertise, and the public to smoke. Again, what was the point of the Government simulating righteous indignation about an increase in drunkenness and road accidents and, on the other hand, saying that there was no need for an inquiry into advertisements of alcohol?

In his reply Mr. J. K. VAUGHAN-MORGAN, Minister of State, Board of Trade, said that he could see no ground for saying that liquor advertising had led to a general deterioration in drinking habits. When the Medical Research Council advised the Government that the most reasonable interpretation of the great increase in deaths from lung cancer was that the cause was smoking tobacco, particularly cigarettes, the Government decided that the facts should be brought to public notice, but that it should be left to the individual to make up his own mind what to do. The Government had asked local authorities to make the facts known. Most authorities had felt that the most profitable field for propaganda was among schoolchildren and school-leavers and had been working in that way. It was true that large sums were spent on advertising particular brands of tobacco, but he did not think that he had ever seen any advertisement actually saying that smoking was good for one. Weaning the consumer who smoked from one brand to another was part of the pattern of competition. He did not believe tobacco advertising was persuading non-smokers to smoke.

Turning to the advertising of medicines, he recalled that under the Food and Drugs Act it was an offence to publish a false or misleading advertisement about the nature, substance, or quality of a drug. Obviously there was left wide scope for publishing advertisements, but all the interests concerned had joined to subscribe to a voluntary code of standards which listed some 60 diseases about which it prohibited advertising, and which set out general principles. The code was likely in due course to be revised. It already eliminated all but occasional unsuitable advertisements which, while abiding by the letter, succeeded in avoiding the spirit of the code. What point would there be in trying to supersede voluntary arrangements which worked well 99% of the time by complicated and cumbersome regulations? There was the additional safeguard that Government departments, especially the Ministry of Health, were constantly on watch to see whether a preparation so advertised was one which should freely be available without a doctor's prescription. There were preparations at present under active consideration. He was sure that action on these lines or a direct approach to the advertiser supplementing the voluntary code offers the most promising line of advance. Our complex industrial society could not function without advertising. We did not need a Royal Commission to lay down canons of taste. These things were better left to the disciplines of public opinion.

Obituary

WILLIAM FRANCIS THEODORE HAULTAIN

O.B.E., M.C., B.A., M.B. Cantab., F.R.C.S.E., F.R.C.P.E., F.R.C.O.G.

Dr. W. F. T. Haultain, the Edinburgh gynæcologist and obstetrician, died on Nov. 18, while visiting his younger son at Pateley Bridge, Yorkshire. He was 65 years of age.

He was the son of Francis W. N. Haultain, also a well-known Edinburgh obstetrician and gynæcologist. From Edinburgh Academy he went to Cambridge, where he graduated B.A. in 1914. He joined up at the outbreak of the 1914–18 war, but he was sent back to qualify in medicine. After graduating M.B. in 1916 he joined the R.A.M.C. and saw service as M.O. attached to the 29th Lancers in France and Palestine and as surgical specialist to the 31st C.C.H. in Palestine and Syria. He was awarded the M.C. after the battle of Cambrai in 1918 and a mention in Lord Allenby's despatches. He was appointed O.B.E. for the excellent work he did in 1919 during the malaria-influenza epidemic in Palestine.

After demobilisation he was appointed an assistant to Professor McKerron at Aberdeen University, but he returned a year later to Edinburgh, where he joined the honorary staffs of Leith Hospital, the Hospital for Diseases of Women, Archibald Place, and later the Royal Maternity & Simpson Memorial Hospital, and the Royal Infirmary. He became lecturer in obstetrics and gynæcology to the School of Medicine of the Edinburgh Royal Colleges and continued this class of systematic teaching till that school was absorbed into the university some ten years ago. He enjoyed teaching and took infinite pains to know and help his students both collectively and individually.

In 1932 he became honorary gynæcologist in charge of wards at the Royal Infirmary, and, under the then existing "fifteen years rule", he had to demit office in 1947 and sever his connection with the Simpson Memorial Maternity Pavilion, which had become a part of the Royal Infirmary in 1939. At this time the health service was being launched, and Haultain was appointed to the newly opened obstetrical and gynæcological units at Bangour Hospital in West Lothian and the Eastern General Hospital in Edinburgh. By his organising ability, energy, and enthusiasm he planned and built up two most efficient departments. He only retired from these appointments in February. At the same time he gave up his private consulting practice.

Haultain played his full part in the general medical life of Edinburgh and Scotland. He was a past president of the Edinburgh Obstetrical Society and served on its council for many years. At the start of the National Health Service he became a member of the regional hospital board in the South-East of Scotland, and he was largely responsible for the development, coordination, and staffing of the obstetrical and gynæcological hospital services in the region. He was largely instrumental in persuading the council of the Royal College of Obstetricians and Gynæcologists to appoint a Scottish standing committee; and he served as chairman of this body from 1950 till 1954. As deputy chairman of the Central Midwives Board (Scotland) he had much to do with the preparation of the latest edition of *Rules* for midwives.

He had examined for the Universities of Aberdeen, St. Andrews, Glasgow, and Durham, and he was still an examiner for the fellowship of the Royal College of Surgeons of Edinburgh and for the membership of the Royal College of Physicians of Edinburgh. He was joint author of *A Handbook of Midwifery and Gynæcology* and of *Antenatal Care*. In 1947 he delivered the Joseph Price oration at Hot Springs, Virginia, to the American Association of Obstetricians, Gynecologists, and Abdominal Surgeons, and in the following year he was elected an honorary fellow of this Association.

He was for many years president of the Edinburgh Academical Football Club, and he took a keen interest in the Edinburgh University Athletic Club. He enjoyed golf and for twenty-five years was secretary of the Edinburgh Royal Colleges Golf Club.

J. S. writes:

"Haultain not only reached the top of his special branch of the profession; by his high sense of duty and public-spiritedness he also contributed in full measure to the wider communal medical life and work of Edinburgh and Scotland. His loyalty, capacity for work, memory for detail, foresight, and flair for organisation made him a valued member of committee and an excellent senior clinician and administrator of a hospital unit. These gifts were used and appreciated by circles other than medical ones.

"In everything he did there was an expression of his genuine love for and interest in his fellow men. His delight was to help, be the need great or small, and the needy young or old, rich or poor. His thoughtfulness, his understanding, and his unobtrusive personal contribution to the smoothing and brightening of many a path for patient, student, colleague, and friend were characteristic of his kindliness and generosity. Many will miss, but remember with gratitude, this kind man."

Dr. Haultain is survived by his wife, two sons, and a daughter.

THOMAS CHARLES CLARE

M.D. Lond., F.R.C.S., F.R.C.O.G.

Mr. T. C. Clare, of Leicester, was a versatile surgeon whose lively mind and likeable character were appreciated wherever he went.

He received his undergraduate training at Birmingham, where he was born, and St. Bartholomew's Hospital. After qualifying in 1905, he proceeded to the F.R.C.S. in 1909 and M.D. in 1910. After being a founder member of the Royal College of Obstetricians and Gynæcologists, he was elected F.R.C.O.G. in 1938.

He was appointed honorary assistant surgeon to the Leicester Royal Infirmary in 1913, later to become honorary surgeon. His normal retirement in 1941 was postponed to 1946 because junior colleagues were on war service; and his vitality enabled him to return to part-time duty some three years later when a younger member of the staff was seriously ill.

His professional life was full of variety, for it included general practice, pathology with the R.A.M.C. in the 1914–18 war in Mesopotamia and the North-West Frontier of India, and surgery and obstetrics and gynæcology at Leicester. His great interest in obstetrics and gynæcology was recognised by his election to the presidency of the Midland Obstetrical and Gynæcological Society in 1938, nine years after being president of the Leicester Medical Society.

As R. L. writes, his published work also ranged widely and was characterised by an originality of mind often years in advance of contemporary thought.

"Tommy Clare was one of medicine's outstanding personalities. He will probably be best remembered by his friends for his almost whimsical character, more than for his other sterling qualities—and who is to say that they are wrong? It was perhaps the Irish in him which allowed him to treat life in such a detached and charming manner. A prolific reader, a great surgeon with an original and most fertile brain, a Mason of high standing and loyal service, a keen fisherman, an enthusiastic golfer, captain, president, and later life-member of his club; a more than average bridge player, a lover of melody and of all Nature, it is not surprising that with such wide interests he had countless true friends.

"Loved by all with whom he came in contact, his influence on his juniors from house-surgeon upwards was remarkable, for he stimulated discussion and argument on every detail. He had the inquiring mind and the wider vision—essential qualities in the leaders of any profession. There were no limits he would not have attained had his course led him to a great medical teaching centre. We, in Leicester, would have been immeasurably the poorer, for we should never have lived with 'good old Tommy'."

Mr. Clare died on Nov. 12, at the age of 77, after several years of ill health.

We regret to announce the death of Mr. W. F. Whitby, who was on the staff of the English Conjoint Board for fifty-three years. He joined as a junior clerk in 1901, and was assistant secretary to the board when he retired in 1953.

Diary of the Week

NOV. 30 TO DEC. 6

Monday, 1st

INSTITUTE OF OBSTETRICS AND GYNÆCOLOGY
4.30 P.M. (Chelsea Hospital for Women, Dovehouse Street, S.W.3.) Mr. Frank Denny: Carcinoma and Other Disorders of the Vulva.

UNIVERSITY OF LIVERPOOL
12 NOON. (New Medical School, Ashton Street, Liverpool.) Mr. D. P. Choyce: Onchocercal Eye Lesions.

Tuesday, 2nd

ROYAL COLLEGE OF SURGEONS OF ENGLAND, Lincoln's Inn Fields, W.C.2
5 P.M. Mr. G. S. M. Botha: The Closing Mechanism Between Stomach and Œsophagus and Its Importance in Surgery of the Gastro-œsophageal Junction. (Hunterian lecture.)

UNIVERSITY COLLEGE, LONDON, Gower Street, W.C.1
5.30 P.M. Dr. W. S. Feldberg: Physiological Aspects of General Anæsthesia.

BRITISH POSTGRADUATE MEDICAL FEDERATION
5.30 P.M. (London School of Hygiene and Tropical Medicine, Gower Street, W.C.1.) Dr. C. N. Armstrong: Intersexuality.

ROYAL SOCIETY OF MEDICINE, 1, Wimpole Street, W.1
8.30 P.M. *Orthopædics.* Mr. William Gissane, Mr. John Charnley, Dr. D. C. Norris: Treatment of Fractures of the Shafts of the Long Bones.

ST. MARY'S HOSPITAL MEDICAL SCHOOL, Paddington, W.2
5 P.M. Mr. E. A. J. Aliment: Fœtal Distress and Resuscitation of the Newborn.

INSTITUTE OF DERMATOLOGY, Lisle Street, W.C.2
5.30 P.M. Dr. Brian Russell: Bacteria on the Skin Surface.

ROYAL ARMY MEDICAL COLLEGE, Millbank, S.W.1
5 P.M. Sir James Paterson Ross: The Changing Scope of Surgery.

UNIVERSITY OF ST. ANDREWS, Dundee
5 P.M. Dr. J. Iball: Investigating the Molecular Structure of Biological Materials.

Wednesday, 3rd

ROYAL SOCIETY OF MEDICINE
5.15 P.M. *History of Medicine.* Mr. Norman Capener: John Sheldon and the Exeter Medical School.
8 P.M. *Surgery.* Dr. Sheila Sherlock, Mr. Peter Knipe, Mr. J. A. Girling: Ascites and Its Management.

POSTGRADUATE MEDICAL SCHOOL, Ducane Road, W.12
2 P.M. Dr. R. I. S. Bayliss: Laboratory Investigations in Endocrinology.

INSTITUTE OF DERMATOLOGY
5.30 P.M. Dr. Arthur Tickner: General Aspects of the Biochemistry of the Skin.

INSTITUTE OF DISEASES OF THE CHEST, Brompton, S.W.3
5 P.M. Mr. W. P. Cleland: Secondary Lung Tumours.

MIDLAND MEDICAL SOCIETY
8.15 P.M. (Birmingham Medical Institute, Edgbaston.) Dr. M. J. Meynell, Dr. Simon Sevitt, Mr. H. C. McLaren: Prevention and Treatment of Pulmonary Embolism.

MEDICO-CHIRURGICAL SOCIETY OF EDINBURGH
8.30 P.M. (18, Nicolson Street, Edinburgh.) Prof. C. F. W. Illingworth: Care of Patients After Gastrectomy.

Thursday, 4th

ROYAL COLLEGE OF SURGEONS OF ENGLAND
5.30 P.M. Sir Stanford Cade: Cancer of the Tongue.

BRITISH POSTGRADUATE MEDICAL FEDERATION
5.30 P.M. (London School of Hygiene and Tropical Medicine.) Dr. E. F. Scowen: Hyperoxaluria.

ROYAL SOCIETY OF MEDICINE
5 P.M. *United Services.* Major-General W. C. Hughes, Lieut.-Colonel M. M. Lewis, Colonel J. A. G. Carmichael, Colonel P. L. E. Wood, Lieut.-Colonel W. O'Brien, Major R. J. C. Hart, Lieut.-Colonel E. M. Walsh: Arthropod-borne and Other Forms of Encephalitis in the Tropics.

BRITISH INSTITUTE OF RADIOLOGY
10.30 A.M. (Church House, Westminster.) Opening of 2-day annual congress.

LIVERPOOL MEDICAL INSTITUTION, 114, Mount Pleasant, Liverpool, 3
8 P.M. Mr. L. H. Savin: Facies in Disease.

UNIVERSITY OF ST. ANDREWS
5 P.M. Prof. J. I. P. James: Early Treatment of the Injured Hand.

Friday, 5th

ROYAL SOCIETY OF MEDICINE
5.30 P.M. *Anæsthetics.* Dr. W. S. McConnell: An Evaluation of General Anæsthetic Techniques for Use in the Dental Surgery.

POSTGRADUATE MEDICAL SCHOOL
10 A.M. Mr. R. V. Cooke: More About Biliary Tract Surgery.
4 P.M. Prof. N. H. Martin: Myelomatosis.

INSTITUTE OF LARYNGOLOGY AND OTOLOGY, 330, Gray's Inn Road, W.C.1
7.30 P.M. Mr. Wallace Black: Swellings in the Neck and Their Management.

PLYMOUTH MEDICAL SOCIETY
8.30 P.M. (Freedom Fields.) Prof. Alan Moncrieff: Marasmus in Young Children—a New Outlook.

Saturday, 6th

INSTITUTE OF LARYNGOLOGY AND OTOLOGY
11.30 A.M. Senator J. A. Sullivan (Toronto): Modern Temporal Bone Surgery.

Notes and News

THE PERINATAL MORTALITY SURVEY

AT a meeting on Nov. 12, Dr. Neville Butler, director of the Perinatal Mortality Survey made this year in England, Wales, and Scotland under the auspices of the National Birthday Trust Fund,[1] reported progress. Return of completed questionaries received at survey headquarters up to Oct. 31 had reached 95% of the 18,005 notified live births from March 3 to 9 and 91·3% of the 8316 notified perinatal deaths in March, April, and May. Special arrangements made for detailed necropsy in all cases of perinatal death during March resulted in centralisation in one or more major centres in sixteen out of nineteen hospital regions, the remainder being done locally. It was known that in at least 85% of the 2700 notified perinatal deaths in March necropsy was performed at special centres—a remarkable result in view of the distances involved and the unusually severe weather. Transport arrangements ceased at the end of March, but nearly 2000 postmortem reports had also been received from group pathologists for necropsies carried out routinely in April and May.

The next stage is the coding and tabulating of information on the schedules, which is being done by the Social Survey (Central Office of Information). Some of the results are likely to be published by the end of 1959 or early in 1960. The intention is to produce the full report in book form, though this will still leave scope for publication of special studies by individuals.

THE RED CROSS

A RECENT addition [2] to a series of books for children, describing famous persons, inventions, and organisations, is about the Red Cross. The greater part of it deals with past and present activities of national Red Cross societies all over the world. Adult readers will know many but not all of these. They may not know, for instance, that it was a Red Cross unit in Camberwell, London, which established the world's first panel of blood-donors. In many countries such units are still entirely responsible for the recruitment of donors, and have evolved an organisation capable of providing blood of rare and anomalous groups at short notice. (A Californian hospital recently asked the Canadian Red Cross for blood of a type restricted to 24 known donors, 21 of them in one family in an Iroquois Indian settlement in Alberta. It was duly collected and delivered.) The first four chapters are of most interest, for they describe how, in 1859, a Swiss financier, Henri Dunant, was involuntarily caught up in the battle of Solferino in North Italy, and was visited by the inspiration from which sprang the International Committee of the Red Cross and the Geneva Convention.

This attractively illustrated book is a useful addition to school and youth-club libraries, and any doctor who presents a copy will find it well worth reading first.

A NEW CALL SYSTEM

A NEW patient-to-nurse signalling system has been installed in an obstetric unit of the London Hospital.

Each patient is provided with a small signalling device, which incorporates a push-button switch and a microphone transmitter and receiver at the end of a piece of flex, so that it can be placed in any convenient position.

When a call is made by pressing the button, signal lamps light up outside the patient's cubicle and in the corridor or nurses' room on an indicator panel (which is in the form of a floor-plan of the unit); at the same time a buzzer attracts the nurses' attention.

To answer the call, the nurse, by adjusting a switch, speaks through a microphone below the indicator panel to the patient, who hears the message by placing her instrument to her ear. The patient then answers by speaking into her microphone. When the nurse goes to the patient's bed she switches off the signal lamp, which indicates to the rest of the nursing staff that the call has been answered.

This system is well suited to a ward—such as the unit at the London—which is architecturally complex, and where the patients are not easily kept under observation. It is simple for the patient to operate, and only slightly more complex for the nurse. At the London Hospital the nurses have found that the system saves time and energy because, knowing the requirements of the patient in advance, they often need to make only one journey to the patient's bed. But some patients in multiple-bed cubicles are self-conscious about speaking into the microphone in front of their neighbours, and others seem to be afraid of the system.

The signalling system was produced by Hadley Telephone & Sound Systems, Ltd., Smethwick, Birmingham.

1. See *Lancet*, 1958, i, 468.
2. The True Book about The Red Cross. By BELINDA PEACEY. London: Frederick Muller. 1958. Pp. 141. 8*s*. 6*d*.

University of Cambridge

On Nov. 15 the following degrees were conferred:

M.D.—John Foster, Ian Oswald, Montague Rayne, M. G. Rinsler.
M.B.—D. I. Atkinson (by proxy), A. R. Thomas.

University of London

On Oct. 22 the degree of M.S. was conferred on L. B. Cohen.

The following have passed the final examination for the degrees of M.B., B.S.:

Honours.—Eric Robert Beck (*a*, *b*), University College; H. J. L. Francis (*a*, *b*, *c*, *d*, *University medal*), University College; K. A. Harrison (*e*), University College; Eadie Heyderman (*b*, *c*), University College; K. J. Holley (*d*), St. Mary's; Valerie Little (*e*), University College; Neil McIntyre (*a*, *c*), King's College; Pauline S. Monro (*a*, *b*), University College; H. S. Platt (*d*), University College; E. B. Raftery (*c*), King's College; D. J. Steward (*d*), Royal Free.

(*a*) *distinguished in pathology*, (*b*) *distinguished in medicine*, (*c*) *distinguished in applied pharmacology and therapeutics*, (*d*) *distinguished in surgery*, (*e*) *distinguished in obstetrics and gynæcology.*

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At recent examinations for the D.P.M. the following were successful:

W. H. Allchin, J. M. Hinton, N. B. Kreitman, Sulammith Wolff.

University of Sheffield

Dr. Margaret Wilson, deputy director of the Public Health Laboratory, Sheffield, has been appointed honorary lecturer in bacteriology.

University of Leeds

On May 14 the honorary degree of D.SC. will be conferred on Sir Rudolph Peters.

The Nuffield Foundation has made a further grant of £2000 a year for three years to provide a temporary lecturer to assist Mr. G. H. Wooler, senior clinical lecturer in thoracic surgery in the department of surgery, at the General Infirmary.

The new lecturer will be a member of a perfusion team concerned with open cardiac surgery. He will be principally responsible for investigating the possibility of combining hypothermia with an assisted circulation which, if successful, should give longer periods of safety for operations within the heart itself.

Royal College of Surgeons of England

On Thursday, Dec. 11, at 5 P.M., at the college, Lincoln's Inn Fields, London, W.C.2, Sir Archibald McIndoe will give a Bradshaw lecture. His subject will be the problem of facial burns.

Royal College of Obstetricians and Gynæcologists

Edgar-Gentilli scholarship.—Applications are invited for this scholarship (£1000 per annum). Further particulars may be found in our advertisement columns.

Royal College of Physicians of Ireland

Major-General G. T. L. Archer has been admitted to the fellowship of the college. The following have been admitted to the membership:

T. E. Lear, Soosainathan Lourdenadin, J. S. McCormick, G. B. Plunkett.

Royal College of Surgeons in Ireland

On Nov. 21 D. M. McNab was admitted to the fellowship.

Postgraduate Courses for G.P.s at Cambridge

Symposia for general practitioners will be held at Addenbrooke's Hospital, Cambridge, on Dec. 6 and 7. Blood disease and reticulosis will be discussed at the first meeting. A series of monthly clinical and clinicopathological meetings is also being held and on Friday, Dec. 12, at 4.15 P.M. Dr. A. J. Rook will open a discussion on melanoma and its precursors.

Royal Institute of Public Health and Hygiene

On Dec. 8, 9, and 10, at 4 P.M., at the institute, 28, Portland Place, London, W.1, Sir Samuel Bedson will give the Harben lectures. His subject will be the psittacosis-lymphogranuloma group of infective agents.

Fountain Hospital

On Tuesday, Dec. 16, at 3 P.M., at the hospital, Tooting Grove, London, S.W.17, Sir Russell Brain will open the new research and diagnostic department.

British Association of Urological Surgeons Home and Overseas

This Association will hold a combined meeting with the Canadian Urological Association in Glasgow from July 15 to 18. Further particulars may be had from the honorary secretary of the Association, 47, Lincoln's Inn Fields, London, W.C.2.

Burden Neurological Institute, Bristol

Dr. W. Ross Ashby, director of research at Barnwood House, Gloucester, has been appointed director of this Institute in succession to Prof. F. L. Golla, who is retiring.

Dr. Ross Ashby, who is 55, was educated at Cambridge and St. Bartholomew's Hospital. After qualifying in 1928 he held posts as pathologist at Watford Peace Memorial Hospital and at St. Andrew's Hospital, Northampton. Since 1947 he has directed the research at Barnwood House, specialising in cybernetic studies of the dynamics of the brain. In *Design for a Brain* (1952) he described his "homœostat", a machine that shows how a system such as the brain can be self-repairing after injury. In 1956 he published *Introduction to Cybernetics*, which has lately been translated and published in the U.S.S.R.

Medical Research Council

The Council invite applications for the following travelling awards for 1959-60:

Rockefeller travelling fellowships in medicine, which are intended for graduates resident in this country who have had some training in research work in medicine, surgery, or medical science; Dorothy Temple Cross research fellowships in tuberculosis, which are offered to suitably qualified British subjects "intending to devote themselves to the advancement by teaching or research of curative or preventive treatment of tuberculosis in all or any of its forms"; Alexander Pigott Wernher travelling fellowships in ophthalmology and otology, which are intended for medical graduates in the United Kingdom and Commonwealth who wish to study the prevention and cure of blindness and deafness. Further particulars of these fellowships and forms of application may be had from the secretary of the Council, 38, Old Queen Street, London, S.W.1, to whom applications should be sent not later than Dec. 31.

Dr. Frank Elliott has been appointed professor of clinical neurology in the Medical School of the University of Pennsylvania, and director of neurological research and education at Pennsylvania Hospital, Philadelphia.

Mr. A. M. Horsnell, director of conservative dentistry in the London Hospital Dental School and dental sub-dean of the London Hospital Medical College, has been appointed to the chair of dental science at the University of Adelaide.

Surgeon Captain T. G. B. Crawford, R.N., has been appointed honorary physician to the Queen in succession to Surgeon Captain C. B. Nicholson, R.N.

Dr. A. G. Watkins, professor of pædiatrics in the Welsh School of Medicine, Cardiff, has been appointed a member of the Committee on the Youth Service of England and Wales which the Minister of Education has set up.

An Order in Council of Nov. 21 brings into operation on Jan. 1, 1959, sections of the Opticians Act, 1958, establishing the General Optical Council. Mr. G. G. Baker, Q.C., Recorder of Wolverhampton, has accepted the invitation of the Privy Council to be chairman of the Council.

A meeting for general practitioners will be held on Sunday, Dec. 7, at 10.15 A.M., at St. Pancras Hospital, St. Pancras Way, London, N.W.1. Lord Amulree will speak on care of the aged.

In the M.B., B.S. pass-list of the University of London which is printed on p. 1185, 7 out of the 11 people awarded honours, including the recipient of the university gold medal, came from University College Hospital Medical School.

Mr. F. Boyes Korkis is to visit New York in January as guest lecturer to the Eastern section of the American Triological Society and as guest chief of otolaryngology at Mount Sinai Hospital.

Dr. J. B. Adams desires it to be known that he has no financial interest of any kind in a book entitled *The Best We Can Do* by Sybille Bedford. He has not assisted in any way in its preparation nor authorised its publication or the use of his photograph for advertising the book.

Appointments

JOHNSTON, H. A., M.B. Belf., D.P.H.: assistant M.O., Luton.

WATERS, M. A. T., M.B. Lond., M.R.C.P.E., D.P.M.: consultant psychiatrist, Roundway Hospital, Devizes.

WOLLEN, WACLAW, M.B.E., MED. DIPL. Warsaw, D.P.H., D.P.M.: consultant psychiatrist and deputy physician-superintendent, Darenth Park Hospital, Dartford.

East Anglian Regional Hospital Board:

BRYCE, ALAN, M.B. Glasg., D.M.R.D.: consultant radiologist, North Cambridgeshire hospital group.

DICKSON, J. W., M.B. Lond., F.R.C.S.: consultant orthopædic surgeon, Ipswich and East Suffolk hospital group.

INNES, F. L. F., M.B. Aberd., F.R.C.S.: consultant plastic surgeon, regional burns and plastic unit, West Norwich Hospital.

JACKSON, P. E., M.D. Lond., M.R.C.P.: consultant physician, Peterborough and Stamford hospital group.

KUMAR, B. S., M.B. Punjab: surgical registrar, Memorial Hospital, Peterborough.

MANTELL, M. C. G., M.B. Cantab.: anæsthetic registrar, United Norwich Hospitals.

MORGAN-HUGHES, J. A., M.B. Cantab.: medical registrar, Norfolk and Norwich Hospital.

OSBORN, THOMAS, B.M. Oxon.: registrar in psychiatry, Fulbourn Hospital and Addenbrooke's Hospital.

SMITH, J. W., M.B. Adelaide: surgical registrar, West Norfolk and King's Lynn General Hospital.

ZAMLER, JOHN, M.B. Lond.: assistant clinical pathologist, Papworth Hospital and County Hospital, Huntingdon.

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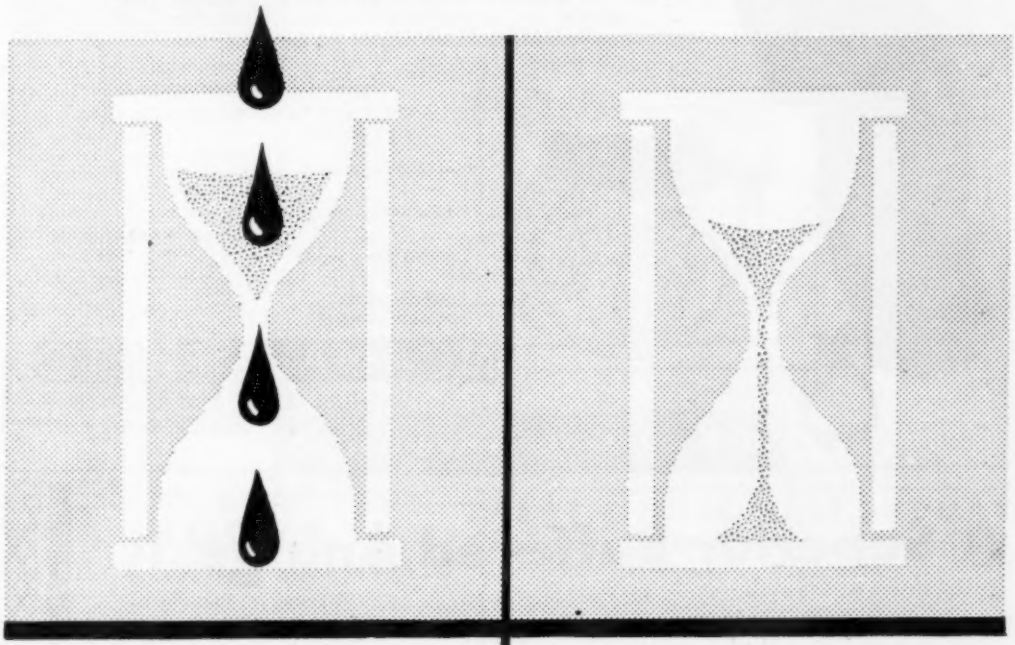

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Anaesthesia, adrenoxyl ad perfusionem and the reduction of blood loss. *Anaesthesia*, 1958, **13**, 56
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Anaesthesia for Fractures of the Femoral neck. *Lancet* 1957, **1**, 1092
Principles of Surgical Technique. *Brit. Med. J.*, 1956, **1**, 925

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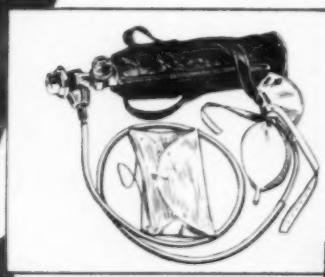

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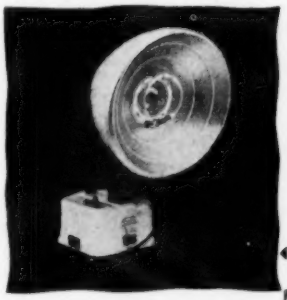

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Academic and Educational

EXAMINING BOARD IN ENGLAND

by the
ROYAL COLLEGE OF PHYSICIANS OF LONDON
and the
ROYAL COLLEGE OF SURGEONS OF ENGLAND

Notice is hereby given that the following EXAMINATIONS will commence on the dates stated below :

DIPLOMA IN INDUSTRIAL HEALTH
1st January
DIPLOMA IN OPHTHALMOLOGY
4th February
DIPLOMA IN PHYSICAL MEDICINE
12th February
DIPLOMA IN MEDICAL RADIO-DIAGNOSIS
19th February
DIPLOMA IN MEDICAL RADIOTHERAPY
19th February
DIPLOMA IN TROPICAL MEDICINE AND HYGIENE
25th February

Applications and fees for either or both Parts of an Examination must reach the Secretary, Examination Hall, Queen-square, London, W.C.1, at least 21 days before Part I of the Examination begins. FRANCIS M. STENT, Secretary.

ROYAL COLLEGE OF SURGEONS OF ENGLAND

COURT OF EXAMINERS

Notice is hereby given that the Council, on 12TH FEBRUARY, 1959, will elect 4 Members of the Court of Examiners to examine in General Surgery.

2 of the Examiners retiring in rotation (Mr. E. C. B. Butler and Mr. S. H. Wasse) are applying for re-election.

Examiners in Surgery who will have retired in rotation during the past 12 months are Mr. C. W. Fleming and Mr. A. Dickson Wright.

Fellows of the College desirous of becoming candidates for the office must make application, in writing, to the Secretary on or before 30th December, 1958. KENNEDY CASSELS.

Lincoln's Inn Fields, London, W.C.2.

ROYAL COLLEGE OF PHYSICIANS OF LONDON

WILLIAM SYDNEY CHARLES COPEMAN, O.B.E., M.D., F.R.C.P., will deliver the FITZPATRICK LECTURES on TUESDAY, 9TH DECEMBER, and THURSDAY, 11TH DECEMBER, 1958, at 5 P.M. at the College, Pall Mall East, S.W.1.

Subject : " Medical Practice in the Tudor Period :
1. The Evolution of the Profession ;
2. The Growth and Status of Medical Practice."

Any member of the Medical Profession admitted on presentation of doctor's card.

By order of the President.
HAROLD BOLDERO, Registrar.

ROYAL COLLEGE OF PHYSICIANS

SALTWELL RESEARCH FUND

Applications are invited for a Saltwell Research Fellowship value £1300 a year with superannuation arrangements. The Fellowship is for a period of 1 year, renewable up to a total period of 3 years. Under the terms of the Fund the Fellow appointed must engage in research work of any type, including clinical epidemiological or laboratory studies in connection with cancer, rheumatism, malaria, or morbid conditions of the prostate gland.

Applications, accompanied by the names of 2 referees, should state details of the proposed work, under whom it is proposed to undertake the work, and the name of the institution where the work is to take place. A grant for reasonable expenses may be paid to the institution concerned.

Further details may be obtained from the Secretary of the Trustees, the Assistant Registrar, Royal College of Physicians, Pall Mall East, London, S.W.1, by whom applications for a Fellowship must be received not later than 23rd February, 1959.

ROYAL COLLEGE OF OBSTETRICIANS AND GYNÆCOLOGISTS

THE EDGAR-GENTILLI SCHOLARSHIP

The Council of the Royal College of Obstetricians and Gynæcologists invite applications for the Edgar-Gentilli Scholarship, tenable for 1 year in the first place.

The primary object of this Scholarship is to encourage research into the causes, nature and treatment of chorion epithelioma. Any work, however, which is concerned with the structure, function and behaviour of the trophoblast, with the interaction of the trophoblast and maternal tissue, or with the normal or diseased placenta will be regarded as having a bearing on this problem.

Moneys awarded under the terms of the Scholarship (up to a total value of £1000 p.a.) can be devoted to the payment of the research-worker and for technical assistants, and/or to the provision of materials and apparatus for those already holding paid appointments.

Application for this Scholarship must reach the Secretary of the Royal College of Obstetricians and Gynæcologists, 58, Queen Anne-street, London, W.1, by 31st December, 1958, and should give details of the candidate's qualifications and research experience, the nature of the work proposed, the estimated expenses under various headings, the period of time for which the work is to be purused, when it is to be done and under whose direction. The names of 2 referees must also be given.

UNIVERSITY OF LONDON

A LECTURE entitled " Examination of Renal Function in Man by Renal Vein Catheterisation " will be delivered by Dr. B. JOSEPHSON (Stockholm) at 5.30 P.M., on 8TH DECEMBER at the London School of Hygiene and Tropical Medicine, Keppel-street, Gower-street, W.C.1.

Admission free, without ticket.

JAMES HENDERSON, Academic Registrar.

UNIVERSITY OF LONDON

INSTITUTE OF OBSTETRICS AND GYNÆCOLOGY
(Incorporating the teaching facilities of Queen Charlotte's Maternity Hospital, Chelsea Hospital for Women, and the Department of Obstetrics and Gynæcology at Hammersmith Hospital)

Applications are invited from graduates with a registrable qualification for enrolment for the SPRING TERM (2ND MARCH to 30TH MAY, 1959). Graduates attend each of the constituent hospitals in turn for clinical work, and attend lectures and special demonstrations at all 3 hospitals. Enrolment fee £3. Tuition fee £36 a term.

General practitioners wishing further experience in obstetrics may be accepted to attend the course at Queen Charlotte's Maternity Hospital for shorter periods—i.e., 2–4 weeks. They will have the opportunity of attending the labour ward in addition to combined classes of lectures and demonstrations at the 3 hospitals of the Institute. Ministry of Health grants are payable to approved general practitioners attending for a period of 1 or 2 weeks.

An INTENSIVE COURSE for those preparing for M.D. and M.R.C.O.G. will be held from 1ST JUNE to 13TH JUNE, 1959.

Hostel accommodation is available at Queen Charlotte's Hospital and at Hammersmith Hospital.

Further particulars can be obtained from the Secretary, Institute of Obstetrics and Gynæcology, Chelsea Hospital for Women, Dovehouse-street, London, S.W.3.

UNIVERSITY OF MANCHESTER

DEPARTMENT OF EDUCATION OF THE DEAF

A COURSE for a limited number of Medical Officers engaged in the public-health service will be held in the Department of Education of the Deaf, the University of Manchester, from 20TH to 23RD JANUARY, 1959, inclusive. Subjects of the course will include the principles and practice of screening tests of hearing, procedures for the assessment of residual capacity to hear in young children and home-guidance to the parents of deaf children.

The fee for the course will be £4 4s.

Applications should be made to the Director, Department of Education of the Deaf, The University, Manchester, 13.

COUNCIL OF EUROPE

MEDICAL FELLOWSHIPS, 1959

The Council of Europe is again offering a strictly limited number of Fellowships for the study of medical and surgical techniques in countries which are members of the Council. The Fellowships will be offered normally only to nationals of those countries, resident there. They will be available for a period of at least 3 months and not exceeding 12 months. Travelling expenses and a monthly stipend will be paid by the Council.

Forms of application (incorporating the regulations) and further information may be obtained from the Ministry of Health, Division 5A, Savile-row, London, W.1. The closing date for return of the completed forms of application is 15th January, 1959.

MEDICAL RESEARCH COUNCIL

ROCKEFELLER TRAVELLING FELLOWSHIPS IN MEDICINE

The Medical Research Council invite applications for Rockefeller Travelling Fellowships in Medicine for the academic year 1959–60. These Fellowships are provided from a fund with which the Council have been entrusted by the Rockefeller Foundation of New York. They are intended for graduates resident in this country who have had some training in research work in clinical medicine or surgery, or in some other branch of medical science, and who are likely to profit by a period of work at a centre in the United States or elsewhere abroad, before taking up appointments for higher teaching or research in the United Kingdom. Fellowships held in the United States will normally have a maintenance allowance at the rate of $3000 p.a. for a single Fellow and $4200 p.a. for a married Fellow. Provision will be made for travelling and other approved expenses, and a small family allowance will also be available.

Further particulars of these Fellowships and forms of application may be obtained from the Secretary, Medical Research Council, 38, Old Queen-street, Westminster, S.W.1, to whom applications should be sent not later than 31st December, 1958. The closing date for other Medical Research Council Travelling Fellowships previously announced, including United States Public Health Service Fellowships, has now been similarly extended until 31st December, 1958.

THE ERNEST AND MINNIE DAWSON CANCER TRUST

A COMPETITION FOR GENERAL MEDICAL PRACTITIONERS

The purpose of the Ernest and Minnie Dawson Cancer Trust, which came into being in 1955, is to arrange competitions between selected general medical practitioners and to give big financial prizes to such practitioners who from time to time make what is considered to be the most valuable contribution to the early diagnosis, prevention, and treatment of cancer and to knowledge of its causes.

The second competition, which will close on 1ST MAY, 1959, will take the form of a thesis on cancer. The subject matter is at the discretion of the entrant, and may relate to cancer in various sites or cancer of 1 organ ; it must also lay emphasis on 1 or more of the following : (*a*) early diagnosis ; (*b*) causes ; (*c*) prevention ; and (*d*) treatment. All entries must contain original thought and observation, and be the result of personal endeavour.

The competition is open to doctors mainly engaged in general practice who practise and/or reside in Lancashire or Yorkshire ; and the maximum prizes offered are £1500 (first) and £500 (second), subject to the merit of the entries submitted.

Entry forms and detailed conditions of entry may be obtained from the Clerk to the Trust, The Ernest and Minnie Dawson Cancer Trust, 89A, Fishergate Hill, Preston, Lancs.

E. PEARSON, Clerk to the Trust.

UNIVERSITY OF OXFORD

RADCLIFFE TRAVELLING FELLOWSHIP, 1959

An Examination for a Fellowship of the annual value of £600, tenable for 2 years, will be held at Oxford on 14TH FEBRUARY, 1959. Candidates must have passed all the examinations for the degree of Bachelor of Arts and Bachelor of Medicine, and must not have exceeded 4 years (exclusive of national service) from the time of passing the last examination for the degree of Bachelor of Medicine.

The examination will take the form of a self-chosen essay and an interview. Further particulars to be obtained from the Regius Professor of Medicine, 13, Norham Gardens, Oxford.

All applications, with essays, must be sent to the Regius Professor of Medicine, 13, Norham Gardens, Oxford, by 31st January, 1959.

UNIVERSITY OF ST. ANDREWS

POSTGRADUATE COURSE IN ANATOMY AND PHYSIOLOGY

Graduates in Medicine and Surgery are invited to make application for a Course in Anatomy and Physiology (including Biochemistry) to be held in the Pre-clinical Departments of St. Salvator's College, University of St. Andrews, from OCTOBER, 1959, to MARCH, 1960.

The number of graduates accepted for this course will be small. They will be attached to, and expected to take some part in the work of, the Anatomy and Physiology Departments. Instruction will be given, formally and informally, in systematic, practical and applied aspects of anatomy, physiology and biochemistry, and students will be afforded opportunity of gaining experience in methods to be individually selected. They will be required to take part in tutorial discussions both with members of staff and with medical undergraduates, and to make themselves familiar with current teaching. The Anatomy Department is responsible for the teaching of histology, and has particular interest in bone, arthrology, heart and central nervous system. The Department of Physiology and Biochemistry operates a course in applied physiology and biochemistry for senior medical students, and is equipped to supervise techniques in neurophysiology and neurochemistry, protein and carbohydrate chemistry, and various aspects of medical biophysics.

The fee for the course will be £36.

Applications should be submitted before 1st May, 1959, to the Dean of the Faculty of Medicine, University of St. Andrews, Queen's College, Dundee, from whom further information may be obtained.

UNIVERSITY OF ST. ANDREWS

COMBINED CLINICAL AND MEDICAL SCIENCES COURSE

Graduates in Medicine and Surgery are invited to make application for a combined Clinical and Medical Sciences Course to be held in Queen's College, Dundee, from OCTOBER, 1959, to MARCH, 1960.

All those taking the Combined Clinical and Medical Sciences Course will have :—

(1) A clinical attachment in the special subject of their choice. In 1959–60 the following subjects will be offered :—

General Surgery.	Respiratory Diseases.
General Medicine.	Obstetrics.
Cardiology.	Gynæcology.
Cardiovascular Surgery.	Pædiatrics.
Endocrinology.	Psychiatry.
Dermatology.	Ophthalmology.
Hæmatology.	Otorhinolaryngology.
Infectious Diseases.	Orthopædics.

(2) A supervisor who would guide their reading and laboratory work in relation to their specialty ; and

(3) All would attend the medical sciences course.

The number accepted for this educational programme will be small and only 1 or at the most 2 candidates will get an attachment in each special subject. The Eastern Regional Hospital Board will give the successful candidate an honorary clinical assistantship within the Unit where he is studying the special subject of his choice. The Supervisor will not only guide the reading and laboratory work of the student but will in appropriate cases allow him to take part in current research programmes. The objective of the medical sciences course which all the postgraduates, whether medical, surgical, or other specialists, will follow is to bring the postgraduate student up to date on current trends in the medical sciences which are of importance to future medical developments.

In addition to this course, the Medical School offers weekly open postgraduate lectures by distinguished visitors and a course of lectures on scientific methods which postgraduate students in the school will be free to attend.

The fee for the course will be £36.

Applications should be submitted before 1st May, 1959, to the Dean of the Faculty of Medicine, University of St. Andrews, Queen's College, Dundee, from whom further information may be obtained.

THE UNIVERSITY OF MANCHESTER. Applications are invited for a post of RESEARCH ASSISTANT in the Department of Bacteriology. The successful candidate will be required to assist in a programme of work on the immunochemistry of *Bordetella pertussis*. The appointment will be made for 1 year in the first instance, and preference will be given to candidates with a Ph.D. degree and suitable experience in biochemistry and microbiology. Salary £750 p.a.

Applications should be sent not later than 6th December, 1958, to the Registrar, the University, Manchester, 13, from whom further particulars and forms of application may be obtained.

THE UNIVERSITY OF SHEFFIELD. Applications are invited from medically qualified candidates for a post of ASSISTANT LECTURER IN PHYSIOLOGY to begin duties on 1st April, 1959, or as soon as possible thereafter. Initial salary on the scale £900–£50–£1100, according to qualifications and experience. F.S.S.U. provision and family allowance.

Further particulars from the Registrar, to whom applications (3 copies) should be sent by 31st December, 1958.

ROYAL FREE HOSPITAL SCHOOL OF MEDICINE. Graduates of the School are invited to apply for the CHARLOTTE BROWN PRIZE of £40 for an essay or published paper on a clinical research project carried out by the applicant. Graduates of the School who have registered within 10 years of 1st May, 1959, are invited to apply for (*a*) the A. B. CUNNING PRIZES of the value of £30 and £20 for an essay of approximately 10,000 words on the subject of "Diet and Obesity"; (*b*) the FLORENCE STONEY PRIZE of £25 for an essay or published paper on the applicant's research work in connection with cancer. Closing date 1st May, 1959.

Details of these competitions may be obtained from the Secretary, 8, Hunter-street, London, W.C.1.

THE UNIVERSITY OF LEEDS. Department of PHYSIOLOGY. Applications are invited for appointment as DEMONSTRATOR (Assistant Lecturer) IN PHYSIOLOGY at a salary on the scale £900–£50–£1000 a year if medically qualified, or within the range £700–£850 a year if not medically qualified.

Applications (3 copies), stating date of birth, qualifications and experience, together with the names of 3 referees, should reach the Registrar, The University, Leeds, 2 (from whom further particulars may be obtained), not later than 29th December, 1958.

THE UNIVERSITY OF LIVERPOOL. Department of CHILD HEALTH. Applications are invited for the following posts :—

LECTURER (full-time). Initial salary within the range £1200–£1500 p.a., according to qualifications and experience. The successful candidate will be granted an honorary contract under the Liverpool Regional Hospital Board as Consultant in respect of 3 sessions at Alder Hey Children's Hospital and/or Mill Road Maternity Hospital.

LECTURER (full-time). Initial salary within the range £1200–£1550 p.a. according to qualifications and experience. The duties will include the conduct of clinics for the Local Health Authority. The successful candidate will be granted an honorary contract under the Regional Hospital Board as Consultant in respect of 2 sessions at Alder Hey Children's Hospital and possibly 2 at Mill Road Maternity Hospital, depending upon the experience of the successful applicant. For both posts clinical responsibility and research facilities under the general direction of the Professor of Child Health will be available within the department.

Applications, stating age, academic qualifications and experience, together with the names of 3 referees, should be received not later than 8th December, 1958, by the Registrar, from whom further particulars of the conditions of appointment may be obtained.

MAKERERE COLLEGE. The University College of EAST AFRICA. Applications are invited for LECTURESHIP IN ANÆSTHESIA in the Department of Surgery. F.F.A.R.C.S. essential. Salary scale is £1353–£2061 p.a., entry-point determined by qualifications and experience. Child allowance £50 p.a. per child (maximum £150 p.a.). F.S.S.U. Rent according to quarters provided, £45–£84 p.a., including basic furniture. Passages paid (up to 4 adult fares) on appointment, termination and leave (3 months every 21 months). Appointment on secondment (minimum 21 months) considered.

Detailed applications (6 copies), naming 3 referees, by 20th January, 1959, to Secretary, Inter-University Council for Higher Education Overseas, 29, Woburn-square, London, W.C.1, from whom further particulars may be obtained.

AUSTRALIA. UNIVERSITY OF ADELAIDE. Gwendolyn MICHELL FOUNDATION FOR MEDICAL RESEARCH. Applications are invited from registered medical practitioners for appointment as RESEARCH SCHOLAR under the Foundation, to conduct research in the field of experimental medicine. The status and salary of the Scholar will be that of a Senior Lecturer (range £A2100–£A2500) or a Reader (range £A2560–£A2800) in the University, depending on the qualifications and experience of the successful candidate. Superannuation on the basic salary on the F.S.S.U. pattern. Additional allowance of £A150 a year for a Senior Lecturer or £A200 a year for a Reader. The appointment will be for a 3-year period in the first instance. The conditions of appointment will be similar to those for Senior Lecturers or Readers in the University, and similar travelling and removal expenses will be provided.

A statement for the information of candidates is available from the Registrar or from the Secretary, Association of Universities of the British Commonwealth, 36, Gordon-square, London, W.C.1. Applications must include the details specified in that statement and must reach the undersigned, in duplicate, by 30th January, 1959. V. A. EDGELOE, Registrar.

University of Adelaide, Adelaide, South Australia.

AUSTRALIA. UNIVERSITY OF ADELAIDE. The University invites applications for the appointment of LECTURER IN PHYSIOTHERAPY.

Salary scale £A1500–£A80–£A2060.

Superannuation on the F.S.S.U. basis.

Terms : Every potential applicant is invited to seek from the Registrar or from the Secretary, Association of Universities of the British Commonwealth, 36, Gordon-square, London, W.C.1, a copy of the general conditions of appointment which give particulars of duties, tenure, study leave, promotion and travelling expenses, and a copy of a statement giving general information about the University and the Department in which the appointment will be made.

University film : A potential applicant in Great Britain may borrow from the Association of Universities of the British Commonwealth a coloured film illustrating the University and the city and surroundings of Adelaide.

The University calendar may be consulted in the library of any University which is a member of the Association of Universities of the British Commonwealth. Further information about the University or post will gladly be supplied on request to the Registrar.

Applications in duplicate, and giving the particulars listed in the general conditions of appointment, should reach the Registrar of the University, Adelaide, South Australia, not later than 31st December, 1958.

AUSTRALIA. UNIVERSITY OF SYDNEY. Director of the University of Sydney Student Health Service. Applications are invited from practitioners of medicine for the position of DIRECTOR of a free diagnostic student health service shortly to be established. It is particularly desirable that applicants have a sound knowledge of internal medicine. The purpose of the service is to advise and refer students seeking advice on health problems and to provide emergency treatment. The salary of the Director will be at the rate of £A3500 p.a., plus cost-of-living adjustment, and will be subject to deductions under the State Superannuation Act. Under the staff members' housing scheme in cases approved by the University and its bankers, married men may be assisted by loans to purchase a house.

Further particulars and information as to the method of application may be obtained from the Secretary, Association of Universities of the British Commonwealth, 36, Gordon-square, London, W.C.1. The closing date for the receipt of applications, in Australia and London, is 15th January, 1959.

Hospital Services: Senior Appointments

HAMMERSMITH HOSPITAL AND POSTGRADUATE MEDICAL SCHOOL, Ducane-road, London, W.12. Applications are invited for the post of Whole-time CONSULTANT RADIOTHERAPIST. The appointment will start as from 1st April, 1959. Candidates may visit the department by arrangement with the Director.

Applications, stating age and giving full details of qualifications and experience, together with the names of 3 referees, to reach the Secretary, Board of Governors, The Hammersmith, West London, and St. Mark's Hospitals, Ducane-road, London, W.12, by 20th December, 1958.

NORTH WEST METROPOLITAN REGIONAL HOSPITAL BOARD.

(1) CONSULTANT PSYCHIATRIST, 5 half-days a week, Child Guidance Training Centre, 6, Osnaburgh-street, N.W.1.

Applications before 29th December, 1958.

(2) ASSISTANT PSYCHIATRIST, Senior Hospital Medical Officer grade, 5 half-days a week, Tavistock Clinic, 2-4, Beaumont-street, W.1. Good general experience in psychiatry required, together with training in psychoanalysis and experience in psychoanalytic group therapy. D.P.M. desirable.

Applications before 5th January, 1959.

Centre and Clinic may be visited by direct appointment.

Application forms obtainable from and returnable to Secretary, North West Metropolitan Regional Hospital Board, 40, Eastbourne-terrace, W.2.

ROYAL NATIONAL THROAT, NOSE AND EAR HOSPITAL, Gray's Inn-road, W.C.1, and Golden-square, W.1. The Board of Governors invites applications for a post of ASSISTANT RADIOLOGIST (Consultant grading) for attendance on 2 sessions weekly, the actual times of which will be arranged. Applicants should have had considerable experience in the radiology of this specialty and should preferably hold a Diploma in Radiology.

Applications, which should give full details of age, qualifications, experience, and posts held, should be sent in triplicate to the House Governor by 10th January, 1959.

SOUTH EAST METROPOLITAN REGIONAL HOSPITAL BOARD. Applications are invited for an appointment as Part-time CONSULTANT ANÆSTHETIST (2 notional half-days weekly) for duties at the Regional Thoracic Surgical Unit, Brook General Hospital, Shooters Hill, S.E.18. The appointment involves an operating session on Thursday afternoons and emergencies. Candidates must have had experience in anæsthesia for cardiac surgery and hold the qualification of F.F.A. R.C.S. Applicants may visit the hospital concerned.

Applications, stating nationality, age, sex, qualifications, experience, including details of war or national service, together with the names and addresses of 3 referees, should be sent to the Secretary, Advisory Appointments Committee, South East Metropolitan Regional Hospital Board, 40, Eastbourne-terrace, Paddington, W.2, not later than 20th December, 1958.

ST. THOMAS'S HOSPITAL, London, S.E.1. Applications are invited for the post of Part-time PHYSICIAN with full Consultant status and membership of the Medical Committee. 4 half-day sessions per week.

Applications (12 copies), naming 3 referees, to Clerk of the Governors by 20th December, 1958.

THE HOSPITAL FOR SICK CHILDREN, Great Ormond-street, London, W.C.1. Applications are invited for the post of CONSULTANT NEUROSURGEON attending 6 to 8 sessions per week. Applicants should be Fellows of the Royal College of Surgeons of England.

Further particulars and form of application which must be returned not later than 15th December, 1958, may be obtained from the undersigned.

H. F. RUTHERFORD, House Governor and Secretary.

BIRMINGHAM REGIONAL HOSPITAL BOARD.

(*a*) Whole-time CONSULTANT PHYSICIAN (geriatrics) responsible for organisation and control of geriatric services covering the areas of Coventry, Nuneaton and Rugby. Wide experience and higher qualification essential.

(*b*) Whole-time CONSULTANT SURGEON to the Burns Unit, Birmingham Accident Hospital. Considerable experience in general and plastic surgery, particularly in the treatment of burns, essential. Interest in research desirable.

(*c*) Part-time CONSULTANT RADIOLOGIST (9 notional half-days weekly), West Bromwich Group of hospitals. Duties mainly at Hallam Hospital, West Bromwich and District Hospital, and other group hospitals. Wide experience specialty and higher qualification essential.

Applications (15 copies), stating age, nationality, qualifications, present and previous appointments and details of 3 referees, to Secretary, 10, Augustus-road, Birmingham, 15, by 29th December, 1958.

LEEDS REGIONAL HOSPITAL BOARD. Applications are invited for the appointment of Locum Tenens ASSISTANT PSYCHIATRIST (Senior Hospital Medical Officer grade) for duties at Scalebor Park Hospital, Burley-in-Wharfedale (452 Beds).

Applications, giving full details of age, qualifications and previous appointments, with dates, together with the names and addresses of 3 referees, should be addressed to the Secretary, Park-parade, Harrogate, by 5th December, 1958.

LIVERPOOL REGIONAL HOSPITAL BOARD. Regional THORACIC SURGERY SERVICE. Applications are invited for the post of ASSISTANT THORACIC SURGEON (Consultant) on maximum part-time sessions. The successful candidate will be required to assist the existing Consultant Thoracic Surgeons with the thoracic surgical work at Broadgreen, Aintree, and other chest hospitals in the Region. The appointment is tenable from 1st April, 1959. Applicants must have wide experience in the specialty, and possession of a higher qualification in general surgery is essential.

Forms of application from Dr. T. Lloyd Hughes, Senior Administrative Medical Officer, Liverpool Regional Hospital Board, 55, Castle-street, Liverpool, 2, to be returned not later than 20th December, 1958.

VINCENT COLLINGE, Secretary to the Board.

LIVERPOOL. THE UNITED LIVERPOOL HOSPITALS. Applications are invited for the whole-time or maximum part-time appointment of CONSULTANT CHEMICAL PATHOLOGIST to The United Liverpool Hospitals. The person appointed would take charge of a newly-created department of Chemical Pathology and would be granted the status of Clinical Pathologist (Part-time) in the Department of Pathology of the University of Liverpool. Candidates must possess a registrable qualification and an honours degree in chemistry or its equivalent and must have had experience in biochemistry.

Applications, giving full particulars of age, qualifications, &c., present and previous appointments and the names of 3 referees, should reach the Secretary, 80, Rodney-street, Liverpool, 1, by 20th December, 1958.

AMENDED ADVERTISEMENT

MANCHESTER REGIONAL HOSPITAL BOARD. Whole-time ASSISTANT PATHOLOGIST (Senior Hospital Medical Officer) in the South Manchester Group with duties mainly at the Wythenshawe Hospital. Successful candidate will work under Consultant supervision. Applicants should have general all-round experience in clinical pathology, and possession of a higher qualification will be an advantage.

Application forms from the Senior Administrative Medical Officer to the Board, Cheetwood-road, Manchester, 8, to be returned by 15th December, 1958.

MANCHESTER REGIONAL HOSPITAL BOARD. Whole-time CONSULTANT GROUP PATHOLOGIST to the Bury and Rossendale Hospitals, mainly at Bury General Hospital. Appointee will be in charge of the Department and will be required to live in or near Bury. Wide experience in hospital pathology essential and higher qualification desirable.

Application forms from the Senior Administrative Medical Officer to the Board, Cheetwood-road, Manchester, 8, to be returned by 10th December, 1958.

SCOTLAND. EASTERN REGIONAL HOSPITAL BOARD. DUNDEE GENERAL HOSPITALS. Applications are invited from registered medical practitioners for the appointment of DEPUTY GROUP MEDICAL SUPERINTENDENT to the Board of Management for the Dundee General Hospitals (totalling 1619 Beds). The 2 main hospitals in the Group are Dundee Royal Infirmary (557 Beds) and Maryfield Hospital (370 Beds). These hospitals are teaching hospitals associated with the Medical School of St. Andrews University. The duties are entirely administrative. Salary £1312 10s.–£70–£1522 10s. p.a. The post is non-resident, but a house could be made available if required.

Further particulars and a form of application may be obtained from the Secretary, Eastern Regional Hospital Board, Bracknowe, 430, Blackness-road, Dundee, with whom applications should be lodged not later than 13th December, 1958. Canvassing, whether direct or indirect, will be a disqualification.

SCOTLAND. EASTERN REGIONAL HOSPITAL BOARD. DUNDEE ROYAL MENTAL HOSPITAL and MARYFIELD HOSPITAL, DUNDEE. Applications are invited for a whole-time appointment of DEPUTY PHYSICIAN-SUPERINTENDENT AND PSYCHIATRIST (Consultant). The duties will be in Dundee Royal Mental Hospital (Westgreen Mental Hospital (660 Beds) and Gowrie House (100 Beds for acute mental illness)) and in the psychiatric ward and Outpatient Clinic of Maryfield Hospital, Dundee, a general and teaching hospital of 370 Beds. These Hospitals are associated with the University of St. Andrews. The persons appointed will be given an honorary appointment from the University. Salary and conditions of service in accordance with national agreement.

Further particulars and forms of application from the Secretary to the Board, 430, Blackness-road, Dundee, with whom applications must be lodged not later than 31st December, 1958.

SCOTLAND. WESTERN REGIONAL HOSPITAL BOARD. Applications are invited for the following appointments :—

CONSULTANT OPHTHALMOLOGIST in charge of wards at the Glasgow Eye Infirmary and with other duties in the area. The appointment will be either whole-time or on the maximum part-time basis of 9 notional half-days per week.

Whole-time SENIOR CASUALTY OFFICER at Greenock Royal Infirmary. Salary at age 32 and over on the scale £1653 15s.–£52 10s.–£2126 5s.

Applications (16 copies), stating date of birth, qualifications, experience, present appointment, and the names of 3 referees, to reach the Secretary, Western Regional Hospital Board, 64, West Regent-street, Glasgow, C.2, not later than 30 days after the publication of this advertisement.

SHEFFIELD REGIONAL HOSPITAL BOARD. Whole-time RESIDENT or NON-RESIDENT SENIOR CASUALTY OFFICER required at the Rotherham Hospital, Doncaster Gate, Rotherham. Salary scale £1653 15s.–£52 10s.–£2126 5s. p.a. Tenure for a period not exceeding 4 years.

Application form and further details from Senior Administrative Medical Officer, Sheffield Regional Hospital Board, Old Fulwood-road, Sheffield. Forms to be returned by 27th December, 1958.

WELSH REGIONAL HOSPITAL BOARD. Consultant ANÆSTHETIST based at Royal Gwent Hospital, Newport, Mon., and will also serve neighbouring hospitals. Candidates should possess F.F.A. R.C.S. Optional whole-time/maximum part-time appointment.

Applications (12 copies), to Senior Administrative Medical Officer, Temple of Peace, Cathays Park, Cardiff, within 21 days.

WEST CORNWALL CLINICAL AREA. South Western REGIONAL HOSPITAL BOARD. Applications are invited for the whole-time appointment of CONSULTANT PATHOLOGIST with a special interest in biochemistry and some experience in hæmatology in the West Cornwall Clinical Area which comprises the districts of Truro, Bodmin, Newquay, St. Austell, Falmouth, Redruth and Penzance. The successful candidate will work mainly at the Royal Cornwall Infirmary, Truro, but will also be required to visit other hospitals in the clinical area as determined by the Regional Board. The successful candidate, if considered to possess suitable qualifications and experience, may be appointed as Area Pathologist who will be required to co-ordinate the Pathological Services in the West Cornwall Clinical Area.

Applications (12 copies), stating date of birth, qualifications and experience, together with the names and addresses of 2 referees, should be sent to the Secretary of the Regional Hospital Board, 27, Tyndalls Park-road, Bristol, 8, not later than 20th December, 1958.

Hospital Services: Junior Appointments

BETHNAL GREEN HOSPITAL, Cambridge Heath-road, London, E.2. 3 HOUSE PHYSICIANS, pre-registration posts.

Apply immediately, stating experience, with copies of 2 testimonials, to Hospital Secretary.

BROMPTON HOSPITAL, S.W.3. Applications are invited for the following posts:

NON-RESIDENT SURGICAL OFFICER (post graded as Senior House Officer or Registrar, according to qualifications and experience) for 6 months from 1st February, 1959, with eligibility for reappointment. Candidates must have held a resident hospital appointment.

RESIDENT HOUSE PHYSICIAN (3 vacancies).

2 vacancies for 6 months from 1st February, 1959. Duties include work in Outpatient Department and wards. 1 of the successful candidates will also be required to undertake duties in E.N.T. Department.

1 vacancy for 9 months from 1st February, 1959. The first 3 months at Brompton Hospital Sanatorium, Frimley, and the following 6 months at the Hospital in London covering work in Outpatient Department and wards. Salary at the rate of £577 10s. p.a.

RESIDENT HOUSE PHYSICIAN to the Cardiac Department for 6 months from 1st March, 1959. Duties include work in Outpatient Department and wards. Salary at the rate of £577 10s. p.a.

Applications, stating age, qualifications, with dates, nationality, and appointments held, together with copies of testimonials, by 6th December, 1958, to KENNETH A. F. MILES, House Governor.

BROMPTON HOSPITAL, S.W.3. Applications invited for the post of Temporary SURGICAL REGISTRAR (whole-time). Salary within the Registrar grade. Appointment is for 1 year, and candidates must hold the diploma of F.R.C.S.

Applications, stating age, qualifications, with dates, nationality, and appointments held, together with copies of testimonials, by 6th December, 1958, to KENNETH A. F. MILES, House Governor.

CHARING CROSS HOSPITAL GROUP. Full-time REGISTRAR (resident) in the Department of Psychological Medicine. Duties in Charing Cross Psychiatric Unit at Wembley Hospital, involving modern physical treatments and psychotherapy for inpatients and outpatients.

Applications, on forms obtainable from the undersigned, to be submitted by 20th December, 1958.

FRANK HART, House Governor and Secretary to the Board.
Charing Cross Hospital, Strand, W.C.2.

CHINGFORD HOSPITAL, London, E.4. (104 Beds.) RESIDENT HOUSE PHYSICIAN required for 6 months with duties at other hospitals in the Group.

Applications, with full details and copies of 2 recent testimonials, should be sent immediately to Secretary, Forest Group Hospital Management Committee, Langthorne-road, E.11.

CITY OF LONDON MATERNITY HOSPITAL, Hanley-road, London, N.4. OBSTETRIC HOUSE SURGEON. Recognised for M.R.C.O.G. Vacant 15th December.

Application forms from Hospital Secretary.

DREADNOUGHT SEAMEN'S HOSPITAL, Greenwich, S.E.10. HOUSE SURGEON (pre-registration) required on 29th December.

Applications, stating age, nationality, qualifications and experience, and giving the names of 3 recent referees, should be sent to the Secretary at the above address not later than 13th December.

EASTERN HOSPITAL, London, E.9. Applications are invited for the resident post, vacant 21st December, 1958, of SENIOR HOUSE OFFICER. The post, which offers good opportunities for postgraduate study, is for 1 year in first instance; duties may include some work in Chest Unit and E.N.T. Department.

Applications should be sent to the Group Secretary, Hackney Hospital, E.9, by 8th December, quoting EH/SHO.

GROUP LABORATORY, Mile End Hospital, Bancroft-road, London, E.1. RESIDENT ASSISTANT PATHOLOGIST (Senior House Officer grade). Previous experience an advantage but not essential. Laboratory recognised for Diploma of Pathology and is well equipped with excellent training facilities. Post vacant 12th January, 1959.

Applications, stating age, nationality, qualifications, experience and copies of not more than 3 testimonials, to the Secretary, Stepney Group Hospital Management Committee, Mile End Hospital, Bancroft-road, E.1.

HAMPSTEAD GENERAL HOSPITAL, Haverstock Hill, N.W.3. (ROYAL FREE HOSPITAL GROUP.) Applications are invited from registered medical practitioners for the post of RESIDENT CASUALTY OFFICER (graded as Senior House Officer). Salary £819 10s. p.a. Vacant 1st January, 1959, tenable for a period of 6 months at the main Outpatient Department, Bayham-street, N.W.1.

Application forms may be obtained from the Secretary, to whom they should be returned, together with copies of 3 recent testimonials, by 11th December, 1958.

HAMPSTEAD GENERAL HOSPITAL, Haverstock Hill, N.W.3. (ROYAL FREE HOSPITAL GROUP.) Applications are invited for the pre-registration post of NON-RESIDENT CASUALTY OFFICER (medical or surgical). Vacant 1st January, 1959, tenable for a period of 6 months.

Application forms may be obtained from the Secretary, to whom they should be returned, together with copies of 3 recent testimonials, by 4th December, 1958.

HIGHLANDS GENERAL HOSPITAL, Winchmore Hill, London, N.21. HOUSE SURGEON for Gynæcological and General Surgery.

Applications, with copies of 3 testimonials and name and address of 1 referee, to Hospital Secretary.

HORNSEY CENTRAL HOSPITAL, Park-road, N.8. JUNIOR HOSPITAL MEDICAL OFFICER, for 1 year in the first instance, renewable annually. Resident post offering wide experience in all branches of medicine. This is a General Practitioner Hospital of 60 Beds, with the necessary consultant services. The Hospital may be visited by direct appointment.

Application forms obtainable from and returnable to the Group Secretary, 46, Cholmeley Park, N.6 (ARC 3070, extension 526/7), by 8th December, 1958.

LAMBETH HOSPITAL, Brook-drive, S.E.11. Lambeth GROUP HOSPITAL MANAGEMENT COMMITTEE. Applications are invited for the post of SENIOR HOUSE OFFICER in Pathology for 6 months at the Group Laboratory. Vacant now. Hospital recognised for Diploma in Pathology.

Application forms from the Secretary.

LANGTHORNE HOSPITAL, London, E.11. Leytonstone (NO. 10) HOSPITAL GROUP. Applications are invited for the post of SENIOR HOUSE OFFICER in the Group Geriatric Unit at above Hospital. This post offers excellent scope for persons interested in this specialty as the most modern methods of geriatric treatment are employed, supervised by a Consultant Geriatrician, with full consultant services in other branches.

Application forms from the Senior Medical Officer, Langthorne Hospital, London, E.11, to be returned by 8th December, 1958.

LONDON HOSPITAL, Whitechapel, E.1. Applications are invited for the post of REGISTRAR to the Department of Encephalography. This Department is part of the Department of Neurology. The work is closely associated with the Department of Neurosurgery, and the post offers good opportunities for research.

Applications (10 copies), giving the names and addresses of 3 referees, should be received by the undersigned by 10th December, 1958. H. BRIERLEY, House Governor.

LONDON JEWISH HOSPITAL, Stepney Green, E.1. (130 Beds.) HOUSE PHYSICIANS (pre- or post-registration). Posts vacant on 7th and 20th January, 1959. 6-month appointments.

Applications, stating age, experience, &c., and copies of not more than 3 testimonials, to be sent to the Hospital Secretary, not later than 5th December, 1958.

NATIONAL HEART HOSPITAL, Maids Moreton, BUCKINGHAM. (Country Branch of the National Heart Hospital.) Applications are invited for the post of RESIDENT MEDICAL OFFICER at the Hospital's country branch. The appointment is for a period of 6 months from 1st January, 1959, but may be renewed for a further period not exceeding 6 months. The status of the post is that of a Senior House Officer and the salary is in accordance with the terms and conditions of service. The holder will be expected to attend on 1 day weekly at the Hospital in Westmoreland-street.

Applications, with copies of 3 recent testimonials, should be sent to me at Westmoreland-street, London, W.1, not later than 5th December, 1958.

ROBERT G. E. WHITNEY, Secretary to the Board.

NATIONAL HOSPITALS FOR NERVOUS DISEASES Applications are invited for the post of RESIDENT MEDICAL OFFICER at Maida Vale Hospital for Nervous Diseases, London, W.9. Appointment in the first instance for 6 months, renewable. Grading as Registrar. Preference will be given to candidates holding a higher degree, and previous neurological experience will be an asset.

Applications, with copies of 3 recent testimonials, should be sent to the Secretary at Maida Vale Hospital not later than 6th December, 1958.

NORTH WEST METROPOLITAN REGIONAL HOS-PITAL BOARD. RESIDENT ANÆSTHETIC REGISTRAR required. 2 years' appointment; first year at Willesden General Hospital, Hariesden-road, N.W.10, second year at Central Middlesex Hospital, Park Royal, N.W.10. Candidates are invited to visit the Hospitals by previous arrangement.

Application forms from, and returnable to, Group Secretary, Central Middlesex Group Hospital Management Committee, Park Royal, London, N.W.10, by 8th December, 1958.

NELSON HOSPITAL, Kingston-road, Merton, S.W.20. RESIDENT ANÆSTHETIST (Senior House Officer grade) with certain duties as House Physician in the Children's Ward and Casualty Department. Post recognised for D.A. Vacant 1st January, 1959.

Applications, stating age, qualifications and experience, with copies of testimonials and the name of 1 referee, should be sent to the Group Secretary, St. Helier Hospital, Carshalton, Surrey.

MARLBOROUGH DAY HOSPITAL, 38, Marlborough-place, London, N.W.10. NORTH WEST METROPOLITAN REGIONAL HOSPITAL BOARD. PSYCHIATRIC REGISTRAR, whole-time, required. Hospital may be visited by direct appointment.

Application form from and returnable to Group Secretary, Central Middlesex Group Hospital Management Committee, Park Royal, N.W.10, by 8th December, 1958.

MEMORIAL HOSPITAL, Shooters Hill, Woolwich, S.E.18. HOUSE SURGEONS. 2 posts vacant 1st January. Approved for pre-registration purposes and recognised for F.R.C.S.

Apply to Secretary.

MILE END HOSPITAL, Bancroft-road, London, E.1. (479 Beds.) HOUSE PHYSICIAN (pre-or post-registration). Post vacant 1st January, 1959.

Application forms, obtainable from Physician-Superintendent, to be returned by 12th December, 1958, with copies of not more than 3 testimonials.

MILE END HOSPITAL, Bancroft-road, London, E.1. (479 Beds.) (Obstetric beds 69, gynæcological beds 31.) SENIOR HOUSE OFFICER (obstetrics and gynæcology). Post vacant 12th December, 1958. Recognised for M.R.C.O.G.

Application forms, obtainable from Physician-Superintendent, to be returned by 5th December, 1958, with copies of not more than 3 testimonials.

MILE END HOSPITAL, Bancroft-road, London, E.1. (479 Beds.) HOUSE SURGEON (pre- or post-registration). Post vacant immediately.

Application forms, obtainable from Physician-Superintendent, to be returned by 5th December, 1958, with copies of not more than 3 testimonials.

QUEEN ELIZABETH HOSPITAL FOR CHILDREN, Hackney-road, E.2; Shadwell, E.1; and BANSTEAD, SURREY. HOUSE OFFICER appointments.

(1) For 2 consecutive periods of 6 months, commencing 1st February, 1959; first period House Physician, Hackney-road (6 months); second period House Surgeon, Hackney-road (2 months), Casualty Officer, Shadwell (4 months).

(2) For 6 months commencing 1st February, 1959, as House Physician, Hackney-road.

(3) For 2 consecutive periods of 6 months, commencing 1st February, 1959; first period House Physician, Shadwell (6 months); second period House Surgeon, Banstead (3 months), Casualty Officer, Hackney-road (3 months).

Application forms may be obtained from the Secretary at Hackney-road, and should be returned with not more than 3 testimonials not later than 13th December, 1958.

ROYAL EYE HOSPITAL, St. George's Circus, S.E.1. Resident Locum CASUALTY OFFICER (Senior House Officer grade) required 22nd December, 1958–2nd January, 1959, inclusive.

Applications to the Secretary (Telephone: WAT 4477).

ROYAL EYE HOSPITAL, St. George's Circus, S.E.1. Applications are invited for the post of HOUSE SURGEON (Senior House Officer grade) from 1st February, 1959. The appointment is for a period of 4 months and the holder will be eligible for subsequent more senior posts in rotation to a maximum of 20 months. The Hospital is recognised for the F.R.C.S. and D.O. examinations.

Application forms from the Hospital Secretary, to be returned not later than 10th December, 1958.

ROYAL FREE HOSPITAL GROUP. Applications are invited from registered Women medical practitioners for 2 resident posts of REGISTRAR in Gynæcology and Obstetrics:—

1. To work at Elizabeth Garrett Anderson Hospital from 1st December, 1958.
2. To work at Elizabeth Garrett Anderson and Hampstead General Hospitals, from 1st January, 1959.

Appointments for 1 year in the first instance.

Application forms may be obtained from the Secretary to the Board of Governors, The Royal Free Hospital, Gray's Inn-road, W.C.1, to whom they should be returned as soon as possible.

ROYAL NATIONAL ORTHOPÆDIC HOSPITAL, 234, Great Portland-street, London, W.1. Applications are invited for the undermentioned posts commencing 1st February, 1959, or as soon as possible:—

3 ORTHOPÆDIC REGISTRARS (full-time), non-resident. Preference will be given to candidates with a higher surgical qualification.

1 CLINICAL ASSISTANT (full-time). The post is graded as Senior House Officer status and will include assisting in out-patient and inpatient work. The work is that of a Junior Registrar and provides wide experience in orthopædics.

Applications to be received by 18th December. Forms of application can be obtained from the House Governor, 234, Great Portland-street, London, W.1.

ROYAL NORTHERN HOSPITAL, Holloway, N.7. Applications are invited for the post of RESIDENT SENIOR HOUSE OFFICER (Pathology) for Group Laboratory, vacant 14th January, 1959. The appointment will afford ample opportunity for study for a higher degree in medicine or surgery.

Applications to be sent to the Hospital Secretary by 9th December, 1958.

ROYAL NORTHERN HOSPITAL, Holloway, N.7. Applications are invited for the post of HOUSE SURGEON, vacant 1st January, 1959. Preference given to pre-registration candidates. Recognised for F.R.C.S.

Applications, with copies of testimonials, to be sent to the Hospital Secretary by 9th December, 1958.

SOUTH EAST METROPOLITAN REGIONAL HOSPITAL BOARD. Applications are invited for an appointment as Whole-time REGISTRAR in Anæsthetics to fill a vacancy in the Greenwich and Deptford Group of hospitals for duties at the Miller General Hospital, Greenwich High-road, S.E.10, and St. Alfege's Hospital, Vanbrugh Hill, S.E.10. The post is recognised for the F.F.A. R.C.S. and D.A. The appointment will be in accordance with the terms and conditions of service of hospital medical and dental staff (England and Wales), and will be for 1 year in the first instance.

Applications, giving particulars of age, qualifications and experience, with relevant dates, together with the names and addresses of 2 referees, to be sent to the Secretary, Registrars Committee, South East Metropolitan Regional Hospital Board, 40, Eastbourne-terrace, London, W.2, not later than 13th December, 1958.

SOUTH EAST METROPOLITAN REGIONAL HOSPITAL BOARD. Applications are invited for an appointment as Whole-time REGISTRAR in General Medicine to fill a vacancy in the Bermondsey and Southwark Group of hospitals. The appointment will be in accordance with the terms and conditions of service of hospital medical and dental staff (England and Wales), and will be for 1 year in the first instance.

Applications, giving particulars of age, qualifications and experience, with relevant dates, together with the names and addresses of 2 referees, to be sent to the Secretary, Registrars Committee, South East Metropolitan Regional Hospital Board, 40, Eastbourne-terrace, W.2, not later than 13th December, 1958.

ST. CHARLES' HOSPITAL, Ladbroke-grove, W.10. (575 Beds.) Required for duty mid-December, SENIOR HOUSE OFFICER for the Orthopædic and Plastic Unit of 58 Beds.

Applications, stating age, qualifications, experience, together with the names and addresses of 2 referees, to reach the Hospital Secretary by 3rd December.

ST. GILES' HOSPITAL, Camberwell, S.E.5. Orthopædic REGISTRAR (Locum Tenens) required from 23rd February, 1959, for 3 months.

Applications, giving details of qualifications and experience, with names of 2 referees, to Group Secretary, Camberwell Hospital Management Committee, Dulwich Hospital, East Dulwich-grove, S.E.22, or inquiries may be made direct to Orthopædic Department, St. Giles' Hospital.

ST. JAMES' HOSPITAL, Balham, S.W.12. Senior House OFFICER (orthopædic and trauma) required 1st December. Post recognised for F.R.C.S.

Applications, stating age, qualifications and experience, with copies of 2 recent testimonials, to Group Secretary, Wandsworth Hospital Group, at above address.

ST. JOHN'S HOSPITAL FOR DISEASES OF THE SKIN, Lisle-street, Leicester-square, London, W.C.2. Applications are invited for the following appointments:—

1. Whole-time SENIOR REGISTRAR. Candidates should have special experience in dermatology and possession of a higher qualification is desirable.
2. RESIDENT SENIOR HOUSE OFFICER for the Inpatient Department.

Applications for both appointments, stating age, qualifications and experience, with names of referees (3 for post 1 and 2 for post 2), should be sent to the Secretary to the Board by 13th December, 1958.

ST. NICHOLAS HOSPITAL, Plumstead, S.E.18. House SURGEONS. Vacant 1st January. Recognised for F.R.C.S. and approved for pre-registration service.

Apply to Group Secretary, Memorial Hospital, Woolwich, S.E.18.

ST. OLAVE'S HOSPITAL, Lower-road, S.E.16. 2 vacancies will be available for HOUSE PHYSICIANS, pre-registration posts, 1 on 1st December, 1958, and 1 on 1st January, 1959. Positions tenable for 6 months.

Applications with full details, and names of 2 referees, to Secretary immediately.

THORPE COOMBE MATERNITY HOSPITAL, Walthamstow, E.17. (58 Beds.) Applications are invited for the post of RESIDENT SENIOR HOUSE OFFICER. Experience in obstetrics is essential. Salary £819 10s. p.a., less £150 p.a. for board-residence.

Applications, with full details and copies of 2 recent testimonials, should be sent to Secretary, Forest Group Hospital Management Committee, Langthorne-road, E.11.

WILLESDEN GENERAL HOSPITAL, Harlesden-road, N.W.10. RESIDENT CASUALTY OFFICER (Senior House Officer) wanted 12th December. Post recognised for fellowship.

Applications, with names of 2 referees, to Hospital Secretary by 3rd December

WOOLWICH GROUP HOSPITAL MANAGEMENT COMMITTEE. HOUSE PHYSICIANS. 6 appointments vacant 1st January. 3 at Brook General Hospital, Woodwich, and 3 at St. Nicholas Hospital, Plumstead. All posts approved for pre-registration service.

Applications to Group Secretary, Memorial Hospital, Woolwich, S.E.18, not later than 3rd December.

WHIPPS CROSS HOSPITAL, London, E.11. Leytonstone (No. 10) HOSPITAL GROUP. Applications are invited for the post of pre-registration HOUSE SURGEON for the Gynæcology and Urology Departments at above Hospital. This post becomes vacant 1st January, 1959.

Application forms obtainable from and returnable to the Hospital Secretary by 9th December, 1958.

WHIPPS CROSS HOSPITAL, London, E.11. Leytonstone (No. 10) HOSPITAL GROUP. Applications are invited for the post of HOUSE SURGEON (post- or pre-registration) in the Orthopædic Department at above Hospital. This post, which is recognised for the F.R.C.S., becomes vacant 31st December, 1958.

Application forms obtainable from and returnable to the Hospital Secretary by 9th December, 1958.

WHIPPS CROSS HOSPITAL, London, E.11. Leytonstone (NO. 10) HOSPITAL GROUP. Applications are invited for 2 posts of Pre-registration HOUSE SURGEON (general surgery) at above Hospital. Both posts become vacant 1st January, 1959.

Application forms obtainable from and returnable to the Hospital Secretary by 9th December, 1958.

ABERGAVENNY. PEN-Y-VAL AND MAINDIFF COURT HOSPITALS. THE VALE OF USK HOSPITAL MANAGEMENT COMMITTEE. Applications are invited for the post of JUNIOR HOSPITAL MEDICAL OFFICER at above Hospital. The appointment offers widely varied experience in all branches of psychiatry. Maindiff Court is a modern early-treatment psychiatric unit with electroencelographic and ancillary departments. Duties include attendance at outpatient clinics, including child guidance. Opportunities provided for attendance at courses for D.P.M. Salary according to national scales. Residential accommodation available.

Applications, together with the names of 2 referees, to be forwarded immediately to the Medical Superintendent, Pen-y-val Hospital, Abergavenny.

ABERYSTWYTH, CARDIGANSHIRE. GENERAL HOSPITAL. MID-WALES HOSPITAL MANAGEMENT COMMITTEE. HOUSE OFFICER (surgical) required (resident). Post recognised for F.R.C.S. examination. Vacancy immediate.

Applications, stating age, experience, &c., to the Group Secretary, Mid-Wales Hospital Management Committee, 31, North-parade, Aberystwyth, Cardiganshire.

ALTON GROUP HOSPITAL MANAGEMENT COMMITTEE. SOUTH WEST METROPOLITAN REGIONAL HOSPITAL BOARD. REGISTRAR in Surgery (Registrar grade) required for the Alton General Hospital (136 Beds) with duties as required at the Henry Gauvain Hospital (112 beds), Alton. Vacant mid-February, 1959. The post is non-resident.

Forms of application, obtainable from the Group Secretary, Lord Mayor Treloar Orthopædic Hospital, Alton, Hants, must be completed and returned by 10th December, 1958.

ALTRINCHAM GENERAL HOSPITAL and ANNEXE and E.N.T. DEPARTMENT. (183 Beds.) Applications are invited for the following pre-registration posts vacant January, 1959:—

JUNIOR HOUSE OFFICER (medical).

JUNIOR HOUSE OFFICER (surgical).

Applications to Group Secretary, North and Mid-Cheshire Hospital Management Committee, The Hospital, Sinderland-road, Altrincham, Cheshire.

ARLESEY, BEDFORDSHIRE. THREE COUNTIES HOSPITAL. NORTH WEST METROPOLITAN REGIONAL HOSPITAL AREA. Applications are invited for the post of SENIOR HOUSE OFFICER at the above Mental Hospital of 1300 Beds for work in the Hospital and Outpatient Clinics. Resident or non-resident. The Hospital is recognised for the D.P.M., and facilities will be given for taking this examination.

Application, with 2 recent testimonials, should be addressed to the Medical Superintendent as soon as possible.

ASHFORD HOSPITAL, Ashford, Middlesex. (560 Beds.) STAINES GROUP HOSPITAL MANAGEMENT COMMITTEE. Required, RESIDENT SENIOR HOUSE OFFICER in Pathology. Previous clinical experience not essential.

Applications, stating age, qualifications and experience, with copies of up to 3 recent testimonials, to Medical Director of Hospital immediately.

ASHTON, HYDE AND GLOSSOP HOSPITAL MANAGEMENT COMMITTEE. JUNIOR HOSPITAL MEDICAL OFFICER (pædiatrics) required at Ashton-under-Lyne General Hospital. Neonatal experience would be especially valuable. Modern pædiatric and premature baby units. Recognised for D.C.H. Appointment limited to 4 years.

HOUSE OFFICER (pædiatrics) also required.

Applications, with copies of 2 references, to Group Secretary, General Hospital, Ashton-under-Lyne, Lancs.

AYLESBURY, BUCKINGHAMSHIRE. TINDAL GENERAL HOSPITAL. E.N.T. HOUSE SURGEON or SENIOR HOUSE SURGEON (grade according to experience). Male or Female). The Department has a high turnover and 4 outpatient clinics weekly. Recognised for D.L.O. and F.R.C.S. No casualty department. Pre-registration post, but registered practitioners invited to apply.

Apply, with copies of 2 testimonials, to Administrative Officer.

AYLESBURY. TINDAL GENERAL HOSPITAL. House PHYSICIAN (Chest Unit), Male or Female. Pre-registration post, but registered practitioners invited to apply. Vacant 24th December, 1958. Duties include care of about 25 chest cases (including tuberculosis chalets) and 4 clinics weekly, including refills, forming a progressive chest unit for the Aylesbury area. Instruction in bronchoscopy and bronchography given. An acute geriatric unit (27 Beds) and a medical outpatient clinic give general medical experience. No Casualty Department.

Apply, with 2 testimonials, to the Administrative Officer.

BARNSTAPLE. NORTH DEVON INFIRMARY. (105 Beds.) HOUSE PHYSICIAN (pre-registration) required immediately.

Applications, naming 2 referees, to Group Secretary, North Devon Hospital Management Committee, 19, Alexandra-road, Barnstaple.

BEDFORD GENERAL HOSPITAL. (424 Beds.) House SURGEON required. Pre- or post-registration, recognised for F.R.C.S. Post offers exceptional opportunities for general experience in busy acute surgical units. Holder of this appointment will be favourably considered for appointment as House Physician at the termination of contract.

Applications, with copies of 2 recent testimonials, to Group Secretary, Bedford Group Hospital Management Committee, 3, Kimbolton-road, Bedford.

BEDFORD GENERAL HOSPITAL. (424 Beds.) North WEST METROPOLITAN REGIONAL HOSPITAL BOARD. GENERAL SURGICAL REGISTRAR (resident) required at above Hospital.

Application forms obtainable from and returnable to Group Secretary, Bedford Group Hospital Management Committee, 3, Kimbolton-road, Bedford, by 8th December.

BEDFORD GENERAL HOSPITAL. (424 Beds.) Resident SENIOR HOUSE OFFICER (obstetrics and gynæcology). Vacant 28th January, 1959. Post recognised for D.Obst.R.C.O.G. The Maternity Unit comprises 71 obstetric and 23 gynæcological beds and the Hospital has a busy Outpatient Department.

Detailed applications, with copies of 2 recent testimonials, to Group Secretary, Bedford Group Hospital Management Committee, Kimbolton-road, Bedford, by 6th December.

BEVERLEY, YORKSHIRE. WESTWOOD HOSPITAL. (229 acute beds.) SENIOR HOUSE OFFICER or HOUSE OFFICER, grading according to experience. Pre-registration post, but fully registered practitioners may apply. Hospital has Maternity Unit of 22 Beds and Gynæcological Annexe of 18 Beds. Married accommodation available.

Detailed applications to Group Secretary.

BEVERLEY, YORKSHIRE. WESTWOOD HOSPITAL. ASSISTANT PATHOLOGIST (Senior House Officer grade) required for Area Laboratory. Offers experience in all branches of pathology.

Detailed applications to Group Secretary.

BIRMINGHAM ACCIDENT HOSPITAL, Bath-row, BIRMINGHAM, 15. (215 Beds and 8 House Surgeons.) HOUSE SURGEONS (resident) required from December onwards. Hospital treats over 50,000 injured patients each year, and is recognised for purpose of casualty training by R.C.S. (Eng.). 6-month appointment, part of which may be spent in 42-bedded segregated Burns Unit.

Apply, naming 2 referees, to Administrator.

BIRMINGHAM, 18. DUDLEY ROAD HOSPITAL. (775 Beds.) HOUSE PHYSICIANS (general medicine). 5 appointments vacant January, 1959. Recognised for pre-registration. Approximately 80 Beds in each firm of 2 Consultants and 2 House Physicians.

Applications, naming 2 referees, to Group Secretary.

BIRMINGHAM, 18. DUDLEY ROAD HOSPITAL. (775 Beds.) Pædiatric Department. HOUSE PHYSICIAN. Vacant 1st February, 1959. Recognised for pre-registration and D.C.H. The department, under direction of 2 Consultant Pædiatricians, has 88 pædiatric beds and cots and 100 neonatal cots. Facilities given for postgraduate instruction and necessary attendance at clinics. Undergraduates of University of Birmingham attend department for clinical instruction.

Applications, naming 2 referees, to Group Secretary.

BIRMINGHAM, 18. DUDLEY ROAD HOSPITAL. (775 Beds.) HOUSE SURGEONS (general surgery). 6 appointments vacant January, 1959. Recognised for pre-registration and F.R.C.S. Approximately 80 Beds in each firm of 2 Consultants and 2 House Surgeons.

Applications, naming 2 referees, to Group Secretary.

BIRMINGHAM, 9. LITTLE BROMWICH GENERAL HOSPITAL. PÆDIATRIC HOUSE PHYSICIAN (Male or Female). Post vacant February, 1959. Recognised for D.C.H. Includes duties on infectious diseases wards, Neonatal Department, and clinics.

Applications to Physician-Superintendent by 24th December, 1958.

BIRMINGHAM REGIONAL HOSPITAL BOARD.

(1) **Birmingham (Dudley Road) Group, Dudley Road Hospital, Birmingham, 18**

REGISTRAR (anæsthetics) (2 appointments). Recognised for F.F.A.R.C.S. Duties at Dudley Road Hospital and other Group Hospitals. Possession of D.A. desirable.

(2) **South Warwickshire Group, 50, Holly-walk, Leamington Spa**

REGISTRAR (anæsthetics). Recognised for F.F.A.R.C.S. Duties mainly at Warwick Hospital (284 Beds.) Experience specialty.

(3) **Birmingham (Selly Oak) Group, Oak Tree-lane, Birmingham, 29**

REGISTRAR (surgical) for Birmingham Accident Hospital, Birmingham, 15 (215 Beds). Duties on accident surgery team with possibility of transfer to Burns Unit. General surgical experience essential. Higher qualification an advantage.

(4) **Stoke-on-Trent Group, Princes-road, Stoke-on-Trent**

REGISTRAR (obstetrics and gynæcology). Duties at City General and Limes Maternity Hospital (Obstetrics 100 Beds, gynæcology 40 Beds). Experience specialty essential. Resident, non-resident. Recognised for M.R.C.O.G. D.Obst.R.C.O.G.

Application forms from Group Secretaries to be returned by 8th December, 1958.

BIRMINGHAM, 29. SELLY OAK HOSPITAL. (Equipped beds 1033.) Applications are invited for the post of SENIOR HOUSE OFFICER (anæsthetics). Resident. Available January, 1959. Recognised for F.F.A. R.C.S.

Applications, stating age, qualifications and experience, with copies of 3 testimonials, to Medical Superintendent. Closing date 15th December, 1958.

BIRMINGHAM, 29. SELLY OAK HOSPITAL. (Equipped beds 1033.) ASSISTANT CASUALTY OFFICER (Senior House Officer.) Resident non-resident. Recognised for F.R.C.S.

Applications, giving qualifications, experience, age, and copies of 3 recent testimonials, should be sent to Medical Superintendent. Closing date 15th December, 1958.

BIRMINGHAM, 29. SELLY OAK HOSPITAL. (Equipped beds 1033.) Applications are invited for the following posts:—

5 HOUSE PHYSICIANS.

HOUSE PHYSICIAN (pædiatrics). Some duties at Moseley Hall Hospital for Children. Recognised for D.C.H.

2 HOUSE SURGEONS. Recognised for F.R.C.S.

2 HOUSE SURGEONS (gynæcology and obstetrics). Recognised for M.R.C.O.G.

All the above posts are pre-registration and are available between 14th January and 7th February, 1959.

Apply to Medical Superintendent, giving age, qualifications, and copies of 3 testimonials. Closing date 15th December, 1958.

BIRMINGHAM, 29. SELLY OAK HOSPITAL. (Equipped beds 1033.). SENIOR HOUSE OFFICER, E.N.T. Department (42 Beds). Resident. Available 11th February, 1959.

Applications, giving age, qualifications and experience, to Medical Superintendent. Closing date 15th December, 1958.

BIRMINGHAM, 29. SELLY OAK HOSPITAL. (Equipped beds 1033.) Applications are invited for the post of SENIOR HOUSE OFFICER (paediatrics). Recognised for D.C.H. Available 14th January, 1959.

Applications, stating qualifications, experience and age, with copies of 3 testimonials, to Medical Superintendent. Closing date 15th December, 1958.

BIRMINGHAM, 16. ST. CHAD'S HOSPITAL. House PHYSICIAN. Vacant 7th January, 1959. Pre- or post-registration.

Applications, stating age, qualifications and experience, with copies of recent testimonials, to Group Secretary, Dudley Road Hospital, Birmingham, 18.

BIRMINGHAM, 16. ST. CHAD'S HOSPITAL. House SURGEON in Obstetrics and Gynæcology required. Vacant 7th January, 1959. Pre- or post-registration.

Applications, stating age, qualifications and experience, with recent testimonials, to Group Secretary, Dudley Road Hospital, Birmingham, 18.

BIRMINGHAM, 16. ST. CHAD'S HOSPITAL. House SURGEON required. Vacant 7th January, 1959. Pre- or post-registration.

Applications, stating age, qualifications and experience, with recent testimonials, to Group Secretary, Dudley Road Hospital, Birmingham, 18.

BIRMINGHAM. THE UNITED BIRMINGHAM HOS-PITALS. THE CHILDREN'S HOSPITAL, Ladywood-road, BIRMINGHAM, 16. Applications are invited for the post of ASSISTANT RESIDENT MEDICAL OFFICER, vacant 7th January, 1959, for 6 months to take charge of Infants Block (66 Cots), followed by 6 months as Resident Medical Officer in charge of the main wards. Valuable opportunity for further study of disease of infancy, some previous experience of which is desirable, M.R.C.P. preferred. Both posts Senior House Officer grade.

Forms of application available from the House Governor and should be returned to him immediately.

G. A. PHALP, Secretary to the Board of Governors.

BIRMINGHAM. THE UNITED BIRMINGHAM HOS-PITALS. Applications are invited for the post of RESIDENT REGISTRAR in anæsthetics to the United Birmingham Hospitals. The appointment is tenable for 6 months in the first instance. Preference will be given to candidates who have passed Part I, D.A., or Primary F.F.A. R.C.S.

Application forms may be obtained from the Secretary, United Birmingham Hospitals, Queen Elizabeth Hospital, Birmingham, 15, and should be returned to him by 6th December, 1958.

BIRMINGHAM. THE UNITED BIRMINGHAM HOS-PITALS. Applications are invited for the post of RESIDENT OBSTETRIC AND GYNÆCOLOGICAL REGISTRAR for duties at the Queen Elizabeth Hospital and The Birmingham and Midland Hospital for Women (Professorial Unit). Vacant immediately.

Forms of application may be obtained from, and should be returned immediately to, the House Governor, Birmingham and Midland Hospitals for Women, Showell Green-lane, Birmingham, 11. G. A. PHALP, Secretary.

BIRMINGHAM. THE UNITED BIRMINGHAM HOS-PITALS. MIDLAND NERVE HOSPITAL. The resident appointment of HOUSE PHYSICIAN is available for the 6-month period commencing 7th January, 1959. Recognised for pre-registration, but registered medical practitioners may apply. This appointment, which gives experience in both psychiatry and neurology, is recognised as a training post for the D.P.M. of the Conjoint Board.

Forms of application from the Secretary, United Birmingham Hospitals, Queen Elizabeth Hospital, Edgbaston, Birmingham, 15, to be returned by 13th December, 1958.

BISHOP AUCKLAND. THE GENERAL HOSPITAL. (350 Beds.) HOUSE SURGEON required. Recognised pre-registration appointment. Accommodation available for married officer with no children.

Apply, naming 2 referees, to Group Secretary, South West Durham Hospital Management Committee, at above address.

BLACKPOOL VICTORIA HOSPITAL. Blackpool and FYLDE HOSPITAL MANAGEMENT COMMITTEE. MANCHESTER REGIONAL HOSPITAL BOARD. Applications are invited for the post of REGISTRAR in the Department of Diagnostic Radiology at the above Hospital which is recognised for the D.M.R.D. Part II. The post offers wide experience in all aspects of the work of a busy hospital group, including thoracic surgery, the Hospital being the Centre for this specialty for the northern part of the Manchester Region.

The Department may be visited by arrangement with the Group Secretary, Victoria Hospital, Blackpool, to whom applications, stating age, qualifications, experience, and the names and addresses of 2 referees, should be sent.

BLACKPOOL VICTORIA HOSPITAL. (354 Beds.) HOUSE PHYSICIAN. Resident pre-registration post vacant 1st January, 1959, in this modern acute hospital, serving the Blackpool and Fylde area.

Applications, stating age, experience (if any), and giving the names and addresses of 2 referees, should be sent to the Hospital Secretary.

BLACKPOOL VICTORIA HOSPITAL (354 Beds.) House Officer (orthopædic and traumatic surgery). Resident pre-registration post recognised for F.R.C.S. available from December, 1958, in the main acute general hospital serving the Blackpool and Fylde area.

Applications, stating age, experience and giving the names and addresses of 2 referees, should be sent to the Hospital Secretary.

BLACKPOOL VICTORIA HOSPITAL. (354 Beds.) SENIOR HOUSE OFFICER (anæsthetics). Post recognised for F.F.A. R.C.S. and D.A. and vacant December. This is a busy acute general hospital with a Regional Thoracic Surgical Unit. At junior level the staff consists of a Junior Hospital Medical Officer, a Registrar and 2 Senior House Officers. The post offers sound practical experience in Anæsthesia, with reasonable off-duty and regular postgraduate lectures.

Applications, stating age, qualifications, experience, and the names and addresses of 2 referees, should be sent to the Hospital Secretary.

BOURNEMOUTH (near). CHRISTCHURCH HOS-PITAL, CHRISTCHURCH, HAMPSHIRE. (334 Beds.) BOURNEMOUTH AND EAST DORSET HOSPITAL MANAGEMENT COMMITTEE. Applications are invited for the appointment of HOUSE SURGEON (pre-registration intern). The post becomes vacant on 11th December, 1958.

Applications to the Hospital Secretary.

BOURNEMOUTH (near). CHRISTCHURCH HOS-PITAL, CHRISTCHURCH, HAMPSHIRE. Applications are invited for the appointment of SENIOR HOUSE OFFICER (surgery). The post becomes vacant on 18th January, 1959.

Applications to the Hospital Secretary.

BOURNEMOUTH (near). CHRISTCHURCH HOS-PITAL, CHRISTCHURCH, HAMPSHIRE. (334 Beds, including 79 medical.) BOURNEMOUTH AND EAST DORSET HOSPITAL MANAGEMENT COMMITTEE. Applications are invited for the appointment of RESIDENT MEDICAL REGISTRAR at the above Hospital. Candidates must be registered medical practitioners. The post, which becomes vacant on 1st February, 1959, is tenable for 1 year in the first instance. Duties will include outpatient work at the Royal Victoria Hospital, Boscombe.

Forms of application are obtainable from the Group Secretary, Hospital Management Committee Office, Royal Victoria Hospital, Boscombe, and should be returned to him within 14 days of the appearance of this advertisement.

BOURNEMOUTH. ROYAL VICTORIA HOSPITAL, Shelley-road. BOURNEMOUTH AND EAST DORSET HOSPITAL MANAGEMENT COMMITTEE. SENIOR HOUSE OFFICER (anæsthetics) required to commence 20th January, 1959. The appointment offers comprehensive experience in the various Hospitals in the Group in the major specialties. No married accommodation available on hospital premises but every effort made to obtain suitable accommodation locally. The post is recognised for the D.A. and F.F.A. R.C.S.

Applications to the Hospital Secretary.

BOURNEMOUTH. ROYAL VICTORIA HOSPITAL, Shelley-road. BOURNEMOUTH AND EAST DORSET HOSPITAL MANAGEMENT COMMITTEE. Applications are invited for the appointment of HOUSE SURGEON (general surgery). The post, which becomes vacant at the beginning of December, is recognised for the F.R.C.S. examination and for pre-registration purposes.

Applications to the Hospital Secretary.

BRIGHTON. ROYAL ALEXANDRA HOSPITAL FOR SICK CHILDREN, Dyke-road, BRIGHTON. (130 Beds.) BRIGHTON AND LEWES HOSPITAL MANAGEMENT COMMITTEE. Vacancy for HOUSE SURGEON for 6 months from 7th January, 1959. The post offers wide experience in paediatrics and is recognised for D.C.H. Open to pre-registration candidates.

Applications, stating age, nationality, qualifications and experience, together with copies of recent testimonials, to be sent to the Administrative Officer.

BRIGHTON. ROYAL SUSSEX COUNTY HOSPITAL. (314 Beds.) SENIOR CASUALTY OFFICER (Junior Hospital Medical Officer grade) required for busy Casualty Department (2 junior medical staff). Recognised for F.R.C.S.

Applications, stating age, qualifications and experience, together with the names of 2 referees, to the Administrative Officer, Royal Sussex County Hospital, Brighton, 7.

BRIGHTON. ROYAL SUSSEX COUNTY HOSPITAL. (314 Beds.) CASUALTY HOUSE SURGEON required end December. Full and varied experience in busy Casualty Department (staff of 3), and also duties in Orthopædic and Traumatic Unit, including charge of beds. Recognised for pre-registration and F.R.C.S.

Applications, stating age, qualifications, experience, and naming 2 referees, to the Administrative Officer, Royal Sussex County Hospital, Brighton, 7.

BRISTOL. COSSHAM AND FRENCHAY HOSPITAL MANAGEMENT COMMITTEE. FRENCHAY HOSPITAL. SENIOR HOUSE OFFICER, Regional Department of Neurosurgery. Vacant immediately, tenable for 6–12 months. The post offers useful surgical experience and the opportunity of gaining a working knowledge of neurological diagnosis. Recognised for F.R.C.S.

Applications to Group Secretary, Frenchay Hospital, quoting "N.S.F." Names of 2 referees required.

BROMLEY HOSPITAL, Bromley, Kent. House Physician required December, for Geriatric Unit with beds at the Lennard and Farnborough Hospitals. Excellent experience in investigation and treatment of acute and chronic diseases in the elderly, and good facilities for study. Opportunity for experience with children (infectious diseases) at the Lennard Hospital.

Apply, stating full particulars, and naming 2 referees, to Administrative Officer, Bromley Hospital, Bromley, Kent.

BURNLEY AND DISTRICT HOSPITAL MANAGEMENT COMMITTEE, BURNLEY GENERAL HOSPITAL (650 Beds), REEDYFORD MEMORIAL HOSPITAL, NELSON (95 Beds). RESIDENT HOUSE OFFICERS (surgical). The appointments are approved as pre-registration posts and recognised for F.R.C.S. Subject to satisfactory service, the successful applicants will be favourably considered for appointment as House Physicians at the termination of contract as Surgical House Officer.

Applications, with 2 references, to Group Secretary, Burnley General Hospital.

BURTON-ON-TRENT GENERAL HOSPITAL. (251 Beds.) HOUSE SURGEONS (general), pre-registration. Busy general base hospital for area. 8 residents. Full Consultant service. Excellent experience. Recognised for F.R.C.S. Married accommodation will be available for a joint post.

Applications to Group Secretary, General Hospital, Burton-on-Trent, Staffordshire.

BURTON-ON-TRENT. THE GENERAL HOSPITAL. HOUSE OFFICER (orthopædics) (pre-registration post) required at the above Hospital. Recognised for F.R.C.S.

Applications to Group Secretary as soon as possible.

BURY AND ROSSENDALE HOSPITAL MANAGEMENT COMMITTEE. Applications are invited for the post of SENIOR HOUSE OFFICER in Anæsthetics. The applicant appointed will have duties at hospitals in the above Group, but will be based at Bury General Hospital. The post, which is recognised for the examinations of the D.A., falls vacant on 31st December, 1958.

Apply, stating full details, and names of 2 referees, to H. WILKINSON, Group Secretary.

BURY ST. EDMUNDS. WEST SUFFOLK GENERAL HOSPITAL. (262 Beds.) JUNIOR HOSPITAL MEDICAL OFFICER required for Casualty duties. Salary £852 10s.–£55–£1182 10s. a year, less £170 a year for resident single persons. Senior House Officer also employed.

Inquiries and applications to Hospital Secretary.

CAMBRIDGE (near). FULBOURN HOSPITAL. Senior HOUSE OFFICER. Resident or non-resident. Previous psychiatric experience not required. This Hospital of 960 Beds is linked with the Cambridge University Department of Psychology and Addenbrooke's Hospital, and provides a basic psychiatric training leading to the D.P.M.

Applications, stating age, qualifications and experience, with names of 2 referees, should be sent to the Medical Superintendent Fulbourn Hospital, near Cambridge.

CANTERBURY. KENT AND CANTERBURY HOSPITAL. (277 Beds.) E.N.T. and Eye Departments. SENIOR HOUSE OFFICER. Salary £819 10s. p.a. Post vacant January, 1959. Approved for F.R.C.S. and special diplomas.

Applications, together with copies of 2 recent testimonials, to be addressed to the Hospital Secretary at the above Hospital.

CANTERBURY. KENT AND CANTERBURY HOSPITAL. (277 Beds.) The post of OBSTETRIC HOUSE SURGEON, which is recognised for the M.R.C.O.G. and D.Obst.R.C.O.G., becomes vacant early January, 1959. National Health Service salary and conditions.

Applications, together with 2 recent testimonials, to be addressed to the Hospital Secretary at the above Hospital.

CARDIFF (near). PRINCE OF WALES ORTHOPÆDIC HOSPITAL, RHYDLAFAR, near CARDIFF. SENIOR HOUSE OFFICER required at above Hospital. Married or single accommodation available.

Form of application from Group Secretary, Cardiff Hospital Management Committee, 44, Cathedral-road, Cardiff.

CARDIFF. THE UNITED CARDIFF HOSPITALS. Applications are invited for the appointment of REGISTRAR in Orthopædics at the Cardiff Royal Infirmary to commence duty February, 1959. Non-resident post.

Application forms are available from the Secretary to the Board at the Cardiff Royal Infirmary, Newport-road, Cardiff, and should be returned within 14 days of the appearance of this advertisement.

CARSHALTON, SURREY. ST. HELIER HOSPITAL. (733 Beds.) SURGICAL REGISTRAR to 1 of the 2 General Surgical Units, comprising 78 Beds. F.R.C.S. an advantage. Post vacant 2nd January, 1959.

Application forms, obtainable from the Group Secretary, to be returned not later than 13th December.

CASTLEFORD, NORMANTON AND DISTRICT HOSPITAL, HIGHTOWN, CASTLEFORD. RESIDENT CASUALTY OFFICER (Senior House Officer grade) required. Furnished house available.

Apply immediately to the Secretary, Pontefract and Castleford Hospital Management Committee, Great Northern House, Salter Row, Pontefract, Yorkshire.

CHERTSEY, SURREY. ST. PETER'S HOSPITAL. (Late Botley's Park War Hospital.) (440 Beds.) RESIDENT HOUSE SURGEON (intern) required. Post recognised for pre-registration service. Salary in accordance with terms and conditions of National Health Service. Post vacant 11th December.

Applications, with names and addresses of referees, to Physician-Superintendent.

CHESTER ROYAL INFIRMARY. Chester and District HOSPITAL MANAGEMENT COMMITTEE. Applications are invited for the post of RESIDENT CASUALTY OFFICER (Junior Hospital Medical Officer), vacant 31st January, 1959.

Applications, giving full details, together with the names and addresses of 2 referees, should be forwarded to the Hospital Secretary.

COLCHESTER GROUP HOSPITAL MANAGEMENT COMMITTEE. Applications invited for :—

Essex County Hospital, Colchester, Essex (181 Beds)

Post of Locum MEDICAL REGISTRAR from 14th December, 1958, for period of few weeks.

Post of SENIOR HOUSE OFFICER to Casualty and Radiotherapy Departments. Tenable for 6 months or 1 year. Recognised for F.R.C.S.

Black Notley Hospital, Braintree, Essex (522 Beds)

Post of HOUSE OFFICER (orthopædic surgery). Duties include care of cases from London Hospital Orthopædic Department. Pre-registration or third post, tenable for 6 months. Recognised for F.R.C.S.

Post of HOUSE SURGEON. Pre-registration or third post. Includes duties in general surgical and gynæcological wards. Recognised for F.R.C.S. Tenable for 6 months.

Applications, with copies of 3 testimonials, to Group Secretary, Colchester Hospital Management Committee, 14, Pope's-lane, Colchester, Essex.

CHELMSFORD AND ESSEX HOSPITAL. (161 Beds.) Applications are invited for the post of RESIDENT HOUSE PHYSICIAN, pre-registration post, to work in the general medical wards of the Hospital. Duties will commence on 13th December.

Applications, together with 2 recent testimonials, to the Secretary, Chelmsford Hospital Management Committee, London-road, Chelmsford.

CHELMSFORD. ST. JOHN'S HOSPITAL. Applications are invited from registered practitioners for the post of RESIDENT PÆDIATRIC HOUSE OFFICER (Male or Female), commencing 23rd December, 1958, to work in the Pædiatric Unit of the Chelmsford Hospital Group. The Unit includes a Premature Baby Nursery of 10 cots and a Neonatal Department in the maternity block of the Hospital. The department is recognised for the D.C.H.

Applications, stating age, nationality, qualifications and experience, together with recent testimonials, should be forwarded not later than 2nd December to the Group Secretary, Chelmsford Group Hospital Management Committee, Chelmsford and Essex Hospital, London-road, Chelmsford, Essex.

COLWYN BAY AND WEST DENBIGHSHIRE HOSPITAL, COLWYN BAY. Applications are invited for the post of JUNIOR HOSPITAL MEDICAL OFFICER to the above Hospital of 60 Beds. The Hospital caters for major surgical, orthopædic and medical cases, and there is a small children's ward. Consultants in these specialties visit daily. A comfortably self-contained furnished flat is available. The post offers excellent experience for a suitably qualified candidate (married or single) who is contemplating entering general practice. The post will be vacant on 1st January, 1959.

Applications, with recent testimonials, should be addressed to William Roberts, Esq., Group Secretary, Clwyd and Deeside Hospital Management Committee, Rhianfa, Russell-road, Rhyl.

COVENTRY AND WARWICKSHIRE HOSPITAL, COVENTRY. ASSISTANT PATHOLOGIST (Junior Hospital Medical Officer status) required for duties mainly at Group Laboratory. Recognised D.Path. Good opportunity for experience in all branches of specialty.

Applications with full details, and names of 2 referees, to Group Secretary, Coventry and Warwickshire Hospital, Coventry.

DENBIGH (near). LLANGWYFAN HOSPITAL. (370 Beds. Pulmonary and non-pulmonary tuberculosis. Hospital contains a major thoracic surgery unit, genitourinary unit, orthopædic unit, and children's unit.) SENIOR HOUSE OFFICER (Male or Female) required at the above Hospital.

Applications, with copies of 2 recent testimonials, to be sent forthwith to the Group Secretary, Clwyd and Deeside Hospital Management Committee, Rhianfa, Russell-road, Rhyl.

DERBY. DERBYSHIRE ROYAL INFIRMARY. (416 Beds.) HOUSE SURGEON (pre-registration) or SENIOR HOUSE OFFICER (general surgery). Resident. 2 vacancies December. Recognised F.R.C.S. if held by Senior House Officer.

Apply, giving full details and 2 names for reference, to Secretary.

DERBY. DERBYSHIRE ROYAL INFIRMARY. (416 Beds. Recognised for F.R.C.S.) SHEFFIELD REGIONAL HOSPITAL BOARD. Whole-time RESIDENT or NON-RESIDENT REGISTRAR (ophthalmology) required. Appointment for 1 year in first instance.

Apply to Secretary, Sheffield Regional Hospital Board, Old Fulwood-road, Sheffield, by 8th December, 1958, giving age, nationality, qualifications, present and previous appointments, with dates, naming 3 referees.

DEWSBURY, YORKSHIRE. STAINCLIFFE GENERAL HOSPITAL. (304 Beds.) Applications are invited for the post of RESIDENT SURGICAL OFFICER (Senior House Officer grade) which becomes vacant on 14th January, 1959. The Surgical Unit comprises 52 Beds for general surgery, and the Hospital is recognised for the F.R.C.S.

Applications, giving full details, should be sent to the Administrative Officer at the Hospital.

DEWSBURY, YORKSHIRE. STAINCLIFFE GENERAL HOSPITAL. (304 Beds.) The pre-registration appointment of HOUSE OFFICER (general surgery) falls vacant on 3rd January, 1959.

Applications, with full details, should be sent to the Administrative Officer at the Hospital.

DEWSBURY, YORKSHIRE. STAINCLIFFE GENERAL HOSPITAL. (304 Beds.) Applications are invited for the appointment of RESIDENT MEDICAL OFFICER (Junior Hospital Medical Officer grade) which becomes vacant on 1st January, 1959. The post is tenable for 1 year in the first instance. The Hospital has an Acute Medical Unit of 70 Beds with 23 pædiatric beds in addition and is recognised for the D.C.H. There are 6 other resident medical staff, including 2 House Physicians.

Applications, giving full details, and the names of 3 referees, should be addressed to the Administrative Officer at the Hospital as soon as possible.

DEWSBURY, YORKSHIRE. THE GENERAL HOSPITAL. (128 Beds.) Applications are invited for the pre-registration post of HOUSE PHYSICIAN (general medicine and dermatology) which becomes vacant at the end of December.

Applications, giving full details, should be sent to the Administrative Officer at the Hospital.

DOUGLAS. NOBLE'S ISLE OF MAN HOSPITAL. (160 Beds.) Applications are invited for pre-registration post of HOUSE SURGEON. Salary in accordance with Whitley scale. 4 residents on staff. Post vacant mid-January.

Apply to the Secretary, Noble's Hospital, Douglas, Isle of Man.

DONCASTER ROYAL INFIRMARY. (330 Beds.) Applications are invited for the post of RESIDENT ANÆSTHETIST in the grade of Senior House Officer. Post recognised under the regulations for the F.F.A. R.C.S. and D.A.

Applications, with copies of 2 recent testimonials, to the Group Secretary, Doncaster Hospital Management Committee, at Doncaster Royal Infirmary.

DONCASTER. WESTERN HOSPITAL. (Recognised under the Regulations for the D.Obst.R.C.O.G. and M.R.C.O.G. (obstetrical experience) and approved for pre-registration service under the Medical Act, 1950.) Applications are invited for the post of OBSTETRICAL HOUSE OFFICER (Senior House Officer or pre-registration post). Vacant mid-January.

Applications, with particulars of experience and copies of 2 recent testimonials, should be forwarded to the Group Secretary, Doncaster Hospital Management Committee, at Doncaster Royal Infirmary by 9th December.

DEVIZES, WILTSHIRE. ROUNDWAY HOSPITAL. (For nervous and mental diseases—1285 Beds.) Applications are invited for the appointment of a JUNIOR HOSPITAL MEDICAL OFFICER for duty at the above Mental Hospital. All forms of modern treatment available, including insulin therapy, and outpatient clinics at 4 general hospitals. This is a trainee post, the Hospital Management Committee paying expenses in connection with study leave and attendance at courses for the D.P.M. Salary £852 10s. p.a., rising by £55 to £1182 10s. p.a. Accommodation for a single man for which £170 p.a. will be charged; or unfurnished modern house available at a moderate rent for a married man.

Applications, giving names and addresses of 2 referees, to the Physician-Superintendent as soon as possible.

DORCHESTER. DORSET COUNTY HOSPITAL. House SURGEON (Male or Female) required for resident, pre-registration post now vacant. Recognised for F.R.C.S. examination and tenable for 6 months.

Apply immediately, stating age, qualifications, and enclosing copy testimonials, to Group Secretary, West Dorset Hospital Management Committee, Damers-road, Dorchester, Dorset.

DORKING GENERAL HOSPITAL, Surrey. (252 Beds.) Applications invited from candidates for the position of SENIOR HOUSE PHYSICIAN (resident). The medical firm consists of a visiting Consultant Physician, a Registrar, and advertised post. Post, vacant 26th January, 1959, offers wide experience in general medicine and for studying for M.R.C.P. examination.

Applications to Medical Superintendent within 14 days.

EPPING. ST. MARGARET'S HOSPITAL. House SURGEON (pre- or post-registration) to very busy General Surgical Unit. F.R.C.S. recognition applied for. Hospital within easy reach of Central London. Post vacant 15th January, 1959.

Applications, with copies of testimonials, including 1 from medical school, to reach the Group Secretary, Epping Group Hospital Management Committee, "Oak Cottage", The Plain, Epping, Essex, by 5th December, 1958.

EPPING. ST. MARGARET'S HOSPITAL. House PHYSICIAN (pre-registration) to Consultant in General Medicine. Post vacant 15th January, 1959.

Applications, with copies of testimonials, 1 from medical school, to reach the Group Secretary, Epping Group Hospital Management Committee, "Oak Cottage", The Plain, Epping, Essex, by 5th December, 1958.

GOOLE. BARTHOLOMEW HOSPITAL. (44 surgical beds.) RESIDENT SENIOR HOUSE OFFICER required for general duties. Flat available on rental.

Applications, with copies of 3 recent testimonials, to Group Secretary, St. John's Hospital, Goole.

GRANTHAM AND KESTEVEN GENERAL HOSPITAL. (118 Beds. Recognised for training for F.R.C.S.). SHEFFIELD REGIONAL HOSPITAL BOARD. Whole-time SURGICAL REGISTRAR required immediately. Appointment for 1 year in first instance.

Apply to Secretary, Sheffield Regional Hospital Board, Old Fulwood-road, Sheffield, by 8th December, 1958, giving age, nationality, qualifications, present and previous appointments with dates, naming 3 referees.

GRIMSBY GENERAL HOSPITAL. Grimsby Hospital MANAGEMENT COMMITTEE. HOUSE PHYSICIAN (pre-registration) required for 1st February, 1959, for above Hospital. Unit of 46 Beds. Medical library and reading facilities available.

Applications, with names of 2 referees, to Hospital Secretary, Grimsby General Hospital, Grimsby.

GUILDFORD. ROYAL SURREY COUNTY HOSPITAL (233 Beds.) RESIDENT HOUSE SURGEON required early in January. Post is tenable for 6 months and approved for pre-registration candidates and recognised for F.R.C.S. examination.

Applications, with copies of testimonials, to be sent to the Hospital Secretary.

GUILDFORD. ROYAL SURREY COUNTY HOSPITAL. (233 Beds.) CASUALTY SENIOR HOUSE OFFICER required. Post recognised for F.R.C.S. examination. 2 Casualty Officers are employed, sharing the work of the department and the orthopædic and traumatic unit, including fracture clinics. Regular instruction given in traumatic surgery.

Applications, with copies of testimonials, to the Hospital Secretary as soon as possible.

GUILDFORD. ROYAL SURREY COUNTY HOSPITAL. (233 Beds.) SENIOR HOUSE OFFICER for Anæsthetics required early December, 1958. Resident or non-resident. Post is recognised for the F.F.A. R.C.S. and includes some work at St. Luke's Hospital. Operations in the main theatres totalled 3860 in 1957.

Apply, with full details of experience and copies of 3 testimonials, to the Hospital Secretary.

HASTINGS. ROYAL EAST SUSSEX HOSPITAL. (146 Beds.) Applications are invited for the pre-registration post of HOUSE SURGEON for General Surgical and Urological Surgery. The Hospital is the main surgical unit in the Group with a resident staff of 5. The post is recognised for F.R.C.S., for which it offers excellent experience. The appointment is for 6 months and falls vacant in mid-January.

Applications, stating age, nationality, qualifications and experience, with copies of 3 recent testimonials, or the names of 2 referees, should be submitted to the Administrator by 15th December, 1958.

GLASGOW. BELVIDERE INFECTIOUS DISEASES HOSPITAL. JUNIOR HOSPITAL MEDICAL OFFICER required for the Chest Clinic.

Applications in writing, supported by the names of 3 referees, to the Secretary and Treasurer, Board of Management for Glasgow Royal Infirmary and Associated Hospitals, 135, Buchanan-street, Glasgow, C.1.

GLASGOW. ROYAL HOSPITAL FOR SICK CHILDREN, YORKHILL, GLASGOW, C.3. Vacancies exist for RESIDENT HOUSE OFFICERS in Surgery and Medicine at the above Hospital, for the term 1st February–31st July, 1959. These are pre-registration posts.

Applications to Medical Superintendent.

HEMEL HEMPSTEAD, HERTFORDSHIRE. WEST HERTS HOSPITAL. 2 HOUSE SURGEONS (pre-registration) required. Posts vacant January.

Applications, giving full details and 2 names for reference, should be sent to the Hospital Secretary as soon as possible.

HEMEL HEMPSTEAD. ST. PAUL'S AND WEST HERTS HOSPITALS. NORTH WEST METROPOLITAN REGIONAL HOSPITAL BOARD. REGISTRAR in Clinical Pathology required at above Hospitals. Post now vacant. Hospitals may be visited by direct appointment.

Application form obtainable from and returnable to Secretary, West Herts Group Hospital Management Committee, 9, Rickmansworth-road, Watford, Hertfordshire.

HEMEL HEMPSTEAD. WEST HERTS HOSPITAL. NORTH WEST METROPOLITAN REGIONAL HOSPITAL BOARD. ANÆSTHETIC REGISTRAR required at above Hospital. Post recognised for F.F.A. R.C.S. Post vacant immediately.

Application form obtainable from and returnable to Secretary, West Herts Group Hospital Management Committee, 9, Rickmansworth-road, Watford, Herts, by not later than 16th December, 1958.

HEREFORD COUNTY HOSPITAL. (341 Beds.) House PHYSICIANS (medicine) required. Post vacant 1st December and 15th December. Pre-registration posts.

Applications, with copies of 2 recent testimonials, to Medical Superintendent, County Hospital, Hereford.

HERTFORD COUNTY HOSPITAL. (171 Beds. Hospital situated 21 miles from London.) Applications are invited for the appointment of HOUSE SURGEON (general surgery, gynæcology and obstetrics) (first or second post). To commence 22nd December, 1958. Pre-registration post, recognised under F.R.C.S. regulations.

Applications to Group Secretary, Hertford Hospital Management Committee, County Hospital, Hertford, Herts.

HEXHAM GENERAL HOSPITAL. (304 Beds.) Applications are invited for the following House appointments, vacant 7th January, 1959. Pre- or post-registration vacancies. Applications will be considered from final-year students in anticipation of graduation and also from registered practitioners.

HOUSE PHYSICIANS.
HOUSE SURGEONS (3). General, combined with orthopædics.

Hospital recognised by R.C.S. Large orthopædic unit providing excellent experience.

Applications, with names of 2 referees, to Group Secretary, General Hospital, Hexham, Northumberland.

HITCHIN, HERTFORDSHIRE. NORTH HERTS HOS-PITAL. RESIDENT HOUSE SURGEON required 4th December. Recognised as pre-registration post and for F.R.C.S.

Applications, stating age, nationality, qualifications and experience, together with copies of 3 recent testimonials, should be sent to the Medical Administrator, Lister Hospital, Hitchin.

HITCHIN HOSPITALS, Hitchin, Hertfordshire. Resident ANÆSTHETIST (Senior House Officer) required 1st January, 1959. Recognised for D.A. and F.F.A. R.C.S. examinations.

Applications, stating age, nationality, qualifications and experience, together with names of 2 referees, to the Medical Administrator, Lister Hospital, Hitchin, by 3rd December, 1958.

HUDDERSFIELD. MILL HILL HOSPITAL, (164 Beds.) HUDDERSFIELD HOSPITAL MANAGEMENT COMMITTEE. Applications are invited for the post of RESIDENT MEDICAL OFFICER (Junior Hospital Medical Officer grade), £852 10s.–£55–£1182 10s. p.a., at the above Hospital. The present allocation of beds is 28 for infectious diseases and 136 for geriatric patients.

Applications, together with copies of 3 recent testimonials, to be addressed to the undersigned as soon as possible.

H. J. JOHNSON, Group Secretary,
Huddersfield Hospital Management Committee.
The Royal Infirmary, Huddersfield.

HUDDERSFIELD ROYAL INFIRMARY. (285 Beds.) HUDDERSFIELD HOSPITAL MANAGEMENT COMMITTEE. HOUSE SURGEON required to commence duty immediately. The post is recognised as a pre-registration appointment and for the F.R.C.S. Salary in accordance with national scale.

Applications, together with copies of 3 recent testimonials, to be addressed to the undersigned as soon as possible.

H. J. JOHNSON, Group Secretary,
Huddersfield Hospital Management Committee,
The Royal Infirmary, Huddersfield.

IPSWICH AND EAST SUFFOLK HOSPITAL (Anglesea-ROAD WING). (350 Beds.) Applications invited for post of CASUALTY OFFICER (Senior House Officer grade), vacant 1st January, 1959. Post recognised for F.R.C.S. examinations.

Applications, stating age, nationality and experience, with copies of recent testimonials, to Hospital Secretary.

IPSWICH AND EAST SUFFOLK HOSPITAL (Anglesea-ROAD WING). (350 Beds.) Applications invited for SENIOR HOUSE OFFICER to Fracture and Orthopædic Department. Post recognised for F.R.C.S. examinations. The Department has about 60 Beds and a large outpatient attendance, offering wide experience.

Applications, stating age, nationality and experience, together with copies of recent testimonials, to Hospital Secretary.

IPSWICH. ST. HELEN'S HOSPITAL. (129 Beds for infectious diseases, pulmonary tuberculosis, long-stay orthopædics and geriatrics. The area Chest Clinic is in the Hospital.) HOUSE PHYSICIAN required (post-registration appointment). Accommodation available for married man.

Applications to JOHN WILLIAMS, Group Secretary, Ipswich Group Hospital Management Committee, at the Ipswich and East Suffolk Hospital (Anglesea-road Wing), Ipswich.

IRVINE. AYRSHIRE CENTRAL HOSPITAL. Junior HOSPITAL MEDICAL OFFICER (infectious diseases.) Post offers wide experience under Consultant supervision in 122-Bed unit. Resident. Whitley terms.

Apply, giving names of 2 referees, to Area Medical Superintendent, 1, Hill-street, Kilmarnock.

KETTERING AND DISTRICT GENERAL HOSPITAL, NORTHAMPTONSHIRE. Applications are invited for the post of HOUSE SURGEON (pre-registration) which becomes vacant on 1st December, 1958. Post recognised for F.R.C.S.

Applications, stating age, experience and qualifications, together with copies of 3 recent testimonials, to be sent to the Group Secretary at the above address.

KETTERING GENERAL HOSPITAL, Kettering. (144 Beds.) Applications are invited from registered medical practitioners for the post of SENIOR HOUSE OFFICER in Anæsthetics, vacant now. Post recognised for D.A.

Applications, giving details of qualifications and experience, and enclosing copies of 3 recent testimonials, to be sent to the Group Secretary, Kettering and District Hospital Management Committee, at the above address.

KETTERING. ST. MARY'S HOSPITAL. Applications are invited for the post of SENIOR HOUSE OFFICER in Obstetrics and Gynæcology at above Hospital. Post vacant early January, 1959. Previous experience is not necessary and the post would provide valuable experience in obstetrics and gynæcology for doctors intending to enter general practice at some future date.

Applications, giving particulars of qualifications and enclosing copies of 3 recent testimonials, should be sent to the Group Secretary, Kettering and District Hospital Management Committee, General Hospital, Kettering.

LEAMINGTON SPA. WARNEFORD HOSPITAL. (211 Beds.) Locum HOUSE PHYSICIAN required. Period 16th December, 1958–15th January, 1959.

Apply Hospital Secretary.

LEEDS REGIONAL HOSPITAL BOARD. Registrar vacancies.

General Medicine

Regional Rheumatism Centre, Harrogate, 240 Beds (9 sessions), and Rheumatism Clinic, General Infirmary, Leeds (2 sessions). Resident at the Royal Bath Hospital, Harrogate.

Ophthalmology

Huddersfield Group (23 eye beds and 1500 new outpatients annually). Non-resident.

Psychiatry

(*a*) Clifton Hospital, York (1100 Beds), resident or non-resident.

(*b*) Naburn and Bootham Park Hospitals, York (614 Beds). Duties principally at Bootham Park. Accommodation for single person. Resident or non-resident.

Applications, stating age, qualifications and details of present and previous appointments, with dates, together with the names and addresses of 3 referees, to the Secretary, Joint Registrars Committee, Park-parade, Harrogate, by 4th December, 1958.

LIVERPOOL AND DISTRICT EASTERN HOSPITAL MANAGEMENT COMMITTEE. Vacancies for HOUSE SURGEONS (obstetrics and gynæcology). Mill Road Maternity Hospital (3) Broadgreen Hospital (2). Appointments vacant from 1st March, 1959, for 6 months. Recognised for D.Obst.R.C.O.G. and pre-registration purposes, but preference given to registered medical practitioners. Salaries £467 10s.–£522 10s.–£577 10s. p.a., according to experience, less £125 p.a., resident charges.

Applications, on forms obtainable from the Group Secretary, Broadgreen Hospital, Liverpool, 14, to be returned completed not later than 6th December, 1958.

LIVERPOOL, 14. BROADGREEN HOSPITAL. Applications are invited for the appointment of SENIOR HOUSE OFFICER (resident) in the Thoracic Surgical Unit. Tenable for a period of 6 months from 1st December next. Salary £819 10s. p.a., less £150 p.a. in respect of resident charges.

Applications, on forms obtainable from the undersigned, to be returned completed as soon as possible.

H. BLYTHE, Group Secretary.

LIVERPOOL, 15. SEFTON GENERAL HOSPITAL. (995 Beds, 116 Cots.) SOUTH LIVERPOOL HOSPITAL MANAGEMENT COMMITTEE. Applications are invited for the following resident appointments which will become vacant at the above-named Hospital on 1st March, 1959, and will be for a period of 6 months. Those posts are approved as pre-registration posts :—

6 HOUSE PHYSICIANS (general).
2 HOUSE PHYSICIANS (psychiatric).
3 HOUSE SURGEONS (general).
2 HOUSE SURGEONS (obstetric).
1 HOUSE PHYSICIAN (tropical).

The terms and conditions of service will be in accordance with the regulations of the Ministry of Health.

Application forms may be obtained from the undersigned, to whom they should be returned not later than Saturday, 20th December, 1958.

GARNET CHAPLIN, Secretary to the Committee.

LIVERPOOL. THE UNITED LIVERPOOL HOSPITALS. Applications are invited for a post of SENIOR REGISTRAR in Pathology for the period ending 30th September, 1959. Annual reappointment thereafter until completion of the normal period of training will be considered without need for further application.

Apply as soon as possible on form obtainable from the Secretary, The United Liverpool Hospitals, 80, Rodney-street, Liverpool, 1.

LEICESTER ROYAL INFIRMARY (500 Beds) and GENERAL HOSPITAL (454 Beds). SHEFFIELD REGIONAL HOSPITAL BOARD. Whole-time NON-RESIDENT REGISTRAR (orthopædics) required Leicester General Hospital (72 orthopædic beds), Leicester Royal Infirmary (54 orthopædic beds). Appointment for 1 year in first instance.

Apply to Secretary, Sheffield Regional Hospital Board, Old Fulwood-road, Sheffield, by 8th December, 1958, giving age, nationality, qualifications, present and previous appointments, with dates, naming 3 referees.

LEICESTER. TOWERS MENTAL HOSPITAL. (1168 Beds.) Applications are invited for the whole-time post of JUNIOR HOSPITAL MEDICAL OFFICER. Salary £852 10s.–£55–£1182 10s. There is ample opportunity for experience in all branches of psychiatry including outpatient work, and the hospital is recognised for D.P.M. experience. Facilities for post-graduate training exist at Sheffield University. Resident accommodation is available for a single man or woman for which the appropriate charge will be made. Candidates must have completed their service with H.M. Forces.

Applications, giving age, nationality, and full details, with the names of 2 referees, to be sent to the Medical Superintendent as soon as possible.

MAIDSTONE. WEST KENT GENERAL HOSPITAL. (141 Beds.) MID-KENT HOSPITAL MANAGEMENT COMMITTEE. Applications are invited for the pre-registration post of HOUSE SURGEON. 6 months' appointment. Vacant 3rd January, 1959. Recognised for F.R.C.S. Salary at the rate of £467 10s.–£577 10s. p.a. A deduction at the rate of £125 a year is made for board and lodging, and other services provided.

Applications should be forwarded, as soon as possible, to the Administrative Officer at the Hospital.

MAIDSTONE. WEST KENT GENERAL HOSPITAL. (141 Beds.) MID-KENT HOSPITAL MANAGEMENT COMMITTEE. CASUALTY OFFICER (Senior House Officer). Recognised for F.R.C.S. Salary £819 10s. a year, less £150 a year for board and lodging. Post vacant February, 1959.

Applications to the Administrative Officer at the Hospital.

MANCHESTER. BOOTH HALL CHILDREN'S HOSPITAL, BLACKLEY, MANCHESTER, 9. Regional centre for severe burns and scalds and plastic surgery (unit of 45 Beds).

JUNIOR HOSPITAL MEDICAL OFFICER required for post vacant on 1st December. £170 deducted for full emoluments.

Applications, giving names and addresses of 2 referees, to be sent to Group Secretary, from whom further particulars may be obtained.

MANCHESTER REGIONAL HOSPITAL BOARD invite applications for the post of Whole-time REGISTRAR in Orthopædics primarily for duty at Park Hospital, Davyhulme, but with occasional duties also at Wrightington Hospital, near Wigan. This is a new appointment concerned with the establishment of a special unit for the study of hip surgery and offers excellent opportunities for candidates with previous orthopædic experience. Residential facilities available at Park Hospital.

Application forms from Group Secretary, Park Hospital, Davyhulme.

MANCHESTER. UNITED MANCHESTER HOSPITALS. MANCHESTER ROYAL EYE HOSPITAL. Applications are invited for the post of RESIDENT SURGICAL OFFICER (Registrar grade).

Application forms may be obtained from the undersigned.

H. R. NORTH,
General Superintendent, Manchester Royal Eye Hospital.

MANCHESTER. UNITED MANCHESTER HOSPITALS. MANCHESTER ROYAL INFIRMARY, MANCHESTER, 13. REGISTRAR to the Department of Diagnostic Radiology to commence as soon as possible. Whole-time, non-resident appointment, for 12 months, renewable.

Application form obtainable from the undersigned, to be returned not later than 13th December, 1958.

G. H. HEATON, Secretary.

MANCHESTER. WEST MANCHESTER HOSPITAL MANAGEMENT COMMITTEE. PARK HOSPITAL, DAVYHULME. (General Hospital—433 Beds.) HOUSE OFFICER (pædiatrics) required. Post-registration. There is a midwifery unit of 73 Beds and a pædiatric unit which includes 10 thoracic surgical beds. Recognised for D.C.H. Post vacant mid-January.

Applications, together with names and addresses of 2 referees, to be forwarded to the Group Secretary.

MANCHESTER, 20. WITHINGTON HOSPITAL. SOUTH MANCHESTER HOSPITAL MANAGEMENT COMMITTEE. Applications are invited for the post of RESIDENT SENIOR HOUSE OFFICER (surgical) including casualty duties, vacant early February, 1959. The post, which is normally tenable for 12 months, is recognised by the Royal College of Surgeons for the final F.R.C.S. examination, and possession of the primary F.R.C.S. will be an advantage. The Hospital is recognised by the Manchester University for the teaching of undergraduate students.

Applications, with full details, to the Group Secretary, Withington Hospital, as soon as possible.

MARKFIELD HOSPITAL, Leicestershire. (215 Beds.) Applications are invited for the appointment of RESIDENT SENIOR HOUSE OFFICER (medical). Experience will be gained in tuberculosis and other diseases of the chest; area chest clinic in hospital in close association with major chest unit in area. Time and opportunity for study.

Applications, giving age, qualifications, previous appointments, together with copies of recent testimonials, to Physician-Superintendent.

MIDDLESBROUGH GENERAL HOSPITAL, Ayresome Green-lane, MIDDLESBROUGH. (305 Beds.) SOUTH TEES-SIDE HOSPITAL MANAGEMENT COMMITTEE. Applications are invited for the appointment of HOUSE OFFICER (general surgery) at the above Hospital. The post is recognised for pre-registration service.

Applications, stating full details, and giving 2 names for reference, should be addressed to the Hospital Secretary as soon as possible.

MIDDLESBROUGH GENERAL HOSPITAL, Ayresome Green-lane, MIDDLESBROUGH. (305 Beds.) SOUTH TEES-SIDE HOSPITAL MANAGEMENT COMMITTEE. Applications are invited for the appointment of SENIOR HOUSE OFFICER (orthopædics) at the above Hospital. The post is recognised for the F.R.C.S. examination and includes some duties in the Casualty Department, which is under the supervision of a full-time Senior Casualty Officer.

Applications, stating age, qualifications and experience, together with the names of 2 referees, should be sent to the Hospital Secretary as soon as possible.

MIDDLESBROUGH GENERAL HOSPITAL, Ayresome Green-lane, MIDDLESBROUGH. (305 Beds.) SOUTH TEES-SIDE HOSPITAL MANAGEMENT COMMITTEE. Applications are invited for the appointment of SENIOR HOUSE OFFICER (casualty) at the above Hospital. The post offers excellent experience in a very busy department for which there is a whole-time Senior Casualty Officer and 2 whole-time Senior House Officers.

Applications, stating full details, together with names for reference, should be sent to the Hospital Secretary as soon as possible.

MIDDLESBROUGH. NORTH ORMESBY HOSPITAL. SOUTH TEES-SIDE HOSPITAL MANAGEMENT COMMITTEE. Applications are invited for the post of HOUSE PHYSICIAN (Male or Female) at the above Hospital. The Medical Unit consists of 52 Beds and has an establishment for 2 House Officers, 1 post being already occupied. The post now being advertised is at present vacant and may be pre-registration House Officer or Senior House Officer grade according to experience. Furnished flat available early January.

Applications, stating age, qualifications and experience, together with the names of 2 referees, should be sent to the Hospital Secretary as soon as possible.

MID-HERTS GROUP HOSPITAL MANAGEMENT COMMITTEE. CLINICAL ASSISTANT(S) in Ophthalmology required for 6 sessions weekly. Duties include work at 3 School Eye Clinics—St. Albans (2 sessions), Hatfield (1 session), Welwyn Garden City (1 session) and hospital attendances for 2 sessions weekly to assist the Consultant at St. Albans City Hospital. The Committee are prepared to consider applications for all 6 sessions or for 3 sessions either (i) 2 school clinic sessions in St. Albans and 1 hospital session, or (ii) 1 Hatfield and 1 Welwyn Garden City session and 1 hospital session. Applicants should indicate the alternative for which he applies. Candidates must have special qualifications or experience in ophthalmology. Hospital and clinics may be visited by appointment. Salary £183 15s. p.a. per session.

Further details and application forms obtainable from and returnable to Secretary, Bleak House, Catherine-street, St. Albans, Herts, by 20th December, 1958.

MID-KENT HOSPITAL MANAGEMENT COMMITTEE. Applications are invited for the appointment of RESIDENT ANÆSTHETIST for joint duties at the West Kent General Hospital, and the Kent County Ophthalmic and Aural Hospital, Maidstone (total beds 254). The post, which is of Senior House Officer grade, carries a salary of £819 10s. a year less £150 for residential emoluments. Excellent experience under Consultant Anæsthetists is available, and the post is recognised for the F.F.A. R.C.S. examination.

Applications, stating age, nationality, qualifications and experience, together with the names of 2 suitable referees, should be forwarded to the Administrative Officer, West Kent General Hospital, Maidstone.

MINEHEAD AND WEST SOMERSET HOSPITAL, MINEHEAD, SOMERSET. Applications are invited for the post of RESIDENT MEDICAL OFFICER (Senior House Officer) with care mainly of medical cases under Consultant staff. 1 other Senior House Officer. 6 months' or 1 year's appointment. Vacant 1st January, 1959. Salary £819 10s. p.a.

Applications to the Secretary, Minehead and West Somerset Hospital, Minehead, Somerset.

MORECAMBE. QUEEN VICTORIA HOSPITAL. (100 Beds.) RESIDENT CASUALTY OFFICER (Junior Hospital Medical Officer grade). Post vacant 1st January, 1959.

Applications, with names of 2 referees, to Group Secretary, Royal Lancaster Infirmary, Lancaster.

NANTWICH, CHESHIRE. BARONY HOSPITAL. Registrar in Medicine required in February, 1959. This post is mainly for general medicine but offers experience in pædiatrics and geriatrics. Whitley Council salary and conditions.

Applications, stating age, qualifications, experience, &c., together with names of 3 referees, to be submitted to the Group Secretary, Group Headquarters, Barony Hospital, Nantwich, by 10th December, 1958.

NEWCASTLE GENERAL HOSPITAL (800 Beds). WALKERGATE HOSPITAL (309 Beds). HOSPITAL FOR SICK CHILDREN (106 Beds). The following resident posts become vacant on 7th January, 1959:—

HOUSE PHYSICIANS (5), pædiatrics. (Hospital for Sick Children, Newcastle upon Tyne (2), Children's Department, Newcastle General Hospital (2), and Walkergate Hospital (1).)

3 of the posts are for pre-registration candidates (medical and surgical). The posts offer experience in the whole of the pædiatric work of the hospitals, including general medicine and surgery and the special departments. There is close association with the University Department of Child Health. Applications for the pre-registration posts will be accepted from students on the point of taking their qualifying examination.

Applications, together with copies of 2 testimonials, should be sent to the Secretary, Newcastle General Hospital, Newcastle upon Tyne, 4, by 6th December, 1958.

NEWCASTLE GENERAL HOSPITAL. (835 Beds.) RESIDENT SENIOR HOUSE OFFICER ANÆSTHETIST required. Hospital recognised for F.F.A. R.C.S.

Applications, stating age, qualifications and experience, with the names and addresses of 2 referees, to be sent as soon as possible to the Secretary, Newcastle General Hospital, Newcastle upon Tyne, 4.

NEWCASTLE GENERAL HOSPITAL. (800 Beds.) The following resident posts which are recognised for the purpose of pre-registration service become vacant on 7th January, 1959:—

HOUSE PHYSICIANS (4), general medical wards. (2 of these posts rotate with the House Physician post in the Cardiovascular Department.)

HOUSE PHYSICIAN (1), Cardiovascular Department. (This post rotates with the 2 House Physician posts in General Medicine.)

HOUSE PHYSICIAN (1), Geriatric Unit.

HOUSE SURGEONS (2), General Surgery. (Recognised for F.R.C.S. Diploma.)

*HOUSE SURGEON (1), Accident and Admission Department. (Recognised for F.R.C.S. Diploma.)

*The person appointed to this post will be given preference for one of the Obstetrical House Surgeon posts in July, 1959.

Applications will be accepted from students on the point of taking their qualifying examination. If a candidate wishes to be considered for more than 1 post, separate applications should be submitted.

Applications, together with names and addresses of 2 referees, should be sent to the Secretary, Newcastle General Hospital, Newcastle upon Tyne, 4, not later than 6th December, 1958.

NEWCASTLE GENERAL HOSPITAL. (835 Beds.) NEWCASTLE UPON TYNE HOSPITAL MANAGEMENT COMMITTEE. SENIOR HOUSE OFFICER, Professorial Psychiatric Unit (54 Beds). Vacant 10th December, 1958. The Unit is under the clinical direction of the Department of Psychological Medicine, King's College Medical School, University of Durham. The Hospital is recognised for the purpose of study for the D.P.M.

Applications, together with the names and addresses of 2 referees, should be sent within 10 days of the appearance of this advertisement to the Secretary, Newcastle General Hospital, Westgate-road, Newcastle upon Tyne, 4.

NEWCASTLE. THE UNITED NEWCASTLE UPON TYNE HOSPITALS. Applications are invited for the non-resident appointment of REGISTRAR to the Throat, Nose and Ear Department at the Royal Victoria Infirmary. The appointment is for 1 year in the first instance and is subject to Ministry of Health terms and conditions of service.

Applications, giving full details and the names and addresses of 3 referees, should be sent to the undersigned within 2 weeks of the appearance of this advertisement.

A. W. SANDERSON, House Governor and Secretary.
Royal Victoria Infirmary, Newcastle upon Tyne.

NEWCASTLE UPON TYNE HOSPITAL MANAGEMENT COMMITTEE AND HEXHAM AND DISTRICT HOSPITAL MANAGEMENT COMMITTEE. Departments of Obstetrics and Gynæcology. Applications are invited for the following posts, vacant on 7th January, 1959:—

(1) **Newcastle General Hospital** (800 Beds)
Department of Obstetrics and Gynæcology (100 Beds).
HOUSE SURGEONS, resident (pre-registration) (3).
This department is recognised for the M.R.C.O.G. and D.Obst.R.C.O.G., and undertakes the training of medical students in the University of Durham. Preference will be given to provisionally registered candidates who have already held an initial pre-registration appointment.

(2) **Hexham General Hospital** (304 Beds)
Gynæcology: HOUSE SURGEON, resident (pre-registration). Recognised for M.R.C.O.G. Applications considered from final year students in anticipation of graduation.

(3) **Dilston Hall Maternity Hospital, Corbridge** (50 Beds)
Obstetrics: HOUSE SURGEON, resident (pre-registration). Recognised for D.Obst.R.C.O.G.

Applications, together with copies of 2 testimonials, should be sent to the Secretary, Newcastle General Hospital, Westgate-road, Newcastle upon Tyne, 4, by 6th December, 1958.

NEWCASTLE UPON TYNE HOSPITAL MANAGEMENT COMMITTEE. Applications are invited for the post of SENIOR HOUSE OFFICER OPHTHALMOLOGIST. The Eye Outpatient Department is at Newcastle General Hospital (835 Beds), and a total of 63 ophthalmic beds are provided at Walker Gate and Walker Accident Hospitals. The Eye Unit is recognised for the D.O.

Applications, with names and addresses of 3 referees, should be sent to the Group Secretary, Newcastle General Hospital, Westgate-road, Newcastle upon Tyne, 4.

NEWCASTLE REGIONAL HOSPITAL BOARD. Sunderland HOSPITAL MANAGEMENT COMMITTEE. REGISTRAR PATHOLOGIST, whole-time, resident; single accommodation; non-resident if married. Unit serves 2047 Beds, also 843 Beds at Cherry Knowle Mental Hospital. Excellent facilities for experience in all branches of clinical pathology. Laboratory recognised for Diploma in Pathology. Post available immediately.

Applications, with names and addresses of 3 referees, to Senior Administrative Medical Officer, Regional Hospital Board, Benfield-road, Newcastle upon Tyne, 6, within 14 days.

NEWCASTLE REGIONAL HOSPITAL BOARD. Senior REGISTRAR ANÆSTHETIST, whole-time, for Newcastle upon Tyne Group of hospitals—main hospital Newcastle General (835 Beds) including special units, i.e., neurosurgical, plastic surgery, &c. Married accommodation available if required.

Applications, with names and addresses of 3 referees, to Senior Administrative Medical Officer, Regional Hospital Board, Benfield-road, Newcastle upon Tyne, 6, within 14 days.

NEWCASTLE REGIONAL HOSPITAL BOARD. Junior HOSPITAL MEDICAL OFFICER, whole-time, for serological and other duties within the Regional Transfusion Centre with occasional attendance for blood collection from donors in the area covered by the Board. Experience in serology desirable but not essential. Applicants may visit the Centre, Westgate-road, Newcastle upon Tyne, 4, by contact with the Director for further details of the post.

Applications, together with the names and addresses of 2 referees, to the Senior Administrative Medical Officer, Regional Hospital Board, Benfield-road, Newcastle upon Tyne, 6, within 14 days.

NEWCASTLE REGIONAL HOSPITAL BOARD. Registrar SURGEON, whole-time, for Surgical Clinic No. 1, Newcastle General Hospital (835 Beds).

Applications, with names and addresses of 3 referees, to Senior Administrative Medical Officer, Regional Hospital Board, Benfield-road, Newcastle upon Tyne, 6, within 14 days.

NEWTON ABBOT HOSPITAL. Resident Senior House SURGEON, Male or Female, required immediately, to act as Casualty Officer and House Surgeon to special departments, together with relief duties. Ability to give outpatient anæsthetics advantageous. Married quarters available.

Applications (quoting reference F.364/41), stating qualifications, nationality, age, with copy testimonials, to be sent to the Group Secretary, Torquay District Hospital Management Committee, Torbay Hospital, Torquay, South Devon.

NORTHWOOD, MIDDLESEX. MOUNT VERNON HOSPITAL. NORTH WEST METROPOLITAN REGIONAL HOSPITAL BOARD. Applications are invited for the post of MEDICAL REGISTRAR. Hospital may be visited by direct appointment.

Application forms obtainable from and returnable to the Group Secretary, Harefield and Northwood Group Hospital Management Committee, Mount Vernon Hospital, Northwood, Middlesex, by 8th December, 1958.

NOTTINGHAM CITY HOSPITAL. (811 Beds.) Applications are invited for the post of HOUSE OFFICER (obstetrics and gynæcology—recognised for pre-registration purposes), which will be graded Senior House Officer or House Officer in accordance with experience. Recognised for the M.R.C.O.G. and D.Obst.R.C.O.G. Post vacant on 11th January, 1959.

Applications, stating age, nationality, qualifications and experience, together with copies of not more than 3 testimonials, to be sent to the Hospital Secretary, City Hospital, Hucknall-road, Nottingham.

NOTTINGHAM CITY HOSPITAL. (811 Beds.) Applications are invited for the post of HOUSE PHYSICIAN vacant on 11th January, 1959. Recognised for pre-registration purposes.

Applications, stating age, nationality, qualifications and experience, together with copies of not more than 3 testimonials, to be sent immediately to the Hospital Secretary, City Hospital, Hucknall-road, Nottingham.

NOTTINGHAM EYE HOSPITAL. Senior House Officer (ophthalmology) required. Duties to commence on 23rd December, 1958. Salary and conditions of service in accordance with Ministry regulations.

Applications, stating age, qualifications and experience, together with copies of testimonials, to be sent to the Group Secretary, General Hospital, Nottingham.

NOTTINGHAM GENERAL HOSPITAL. Senior House OFFICER (orthopædic and fracture) required. Duties to commence early January, 1959. Post offers exceptional experience in traumatic surgery.

Applications, stating age, qualifications and experience, together with copies of testimonials, to be sent to the Group Secretary.

NOTTINGHAM GENERAL HOSPITAL. Pre-registration HOUSE SURGEONS required. Duties to commence end January/beginning February, 1959.

Applications, stating age, qualifications, and experience, together with copies of testimonials, to be sent to Group Secretary.

NOTTINGHAM GENERAL HOSPITAL. Senior House OFFICER (anæsthetics) required about 1st January, 1959. The post is recognised for the D.A. and the F.F.A. R.C.S. This is a busy general hospital, giving experience in all branches of surgery.

Applications, stating age, qualifications and experience, together with copies of testimonials, to be sent to the Group Secretary.

NOTTINGHAM GENERAL HOSPITAL. Senior House OFFICER (surgery) required. Duties to commence about 19th January, 1959.

Applications, stating age, qualifications, experience and nationality, together with copies of testimonials, to be sent to the Group Secretary, General Hospital, Nottingham.

NOTTINGHAM. HIGHBURY HOSPITAL, Bulwell, NOTTINGHAM. SENIOR HOUSE OFFICER (surgical) required. Duties to commence 5th January, 1959. Good opportunity for suitable candidate to gain experience in operating. This post is an excellent one for candidate who wishes to sit for Final F.R.C.S. examination in the near future.

Applications, stating age, qualifications and experience, together with copies of testimonials, to be sent to the Hospital Secretary.

NUNEATON. MANOR HOSPITAL. House Surgeon in Orthopædics and General Surgery (pre-registration). Recognised F.R.C.S., Resident.

Applications to Hospital Secretary.

OXFORD REGIONAL HOSPITAL BOARD. Registrar in Pathology to Stoke Mandeville Hospital, Aylesbury, Bucks. This is a central laboratory providing a wide range of experience in all branches of clinical pathology and recognised for the D.Path. Appointment for 1 year in the first instance, eligible for extension for a second year. Vacant 1st January, 1959.

Applications, on forms obtainable from the Secretary, Registrars Committee, 43, Banbury-road, Oxford, must reach him by 8th December.

OXFORD. THE UNITED OXFORD HOSPITALS. Applications are invited for the post of SENIOR HOUSE OFFICER at the Cowley Road Hospital which is concerned with the treatment of acute and long-stay geriatric patients. This post will be vacant with effect from 1st February, 1959, for 6 months in the first instance.

Applications, with names of 2 referees, to the Administrator, Radcliffe Infirmary, Oxford, should be received not later than 6th December, 1958.

OXFORD. THE UNITED OXFORD HOSPITALS. Applications are invited for the post of SENIOR HOUSE PHYSICIAN in General Medicine at the Churchill Hospital, commencing on 1st February, 1959, for 6 months.

Application forms are obtainable from the Administrator, Radcliffe Infirmary, Oxford, and should be received not later than 6th December, 1958.

PAISLEY. ROYAL ALEXANDRA INFIRMARY ANNEXE. JUNIOR HOSPITAL MEDICAL OFFICER, resident or non-resident, required for above Infirmary for duties, but mainly concerned with chronic sick.

Applications to Group Medical Superintendent, Royal Alexandra Infirmary, Paisley.

PLYMOUTH. SOUTH DEVON AND EAST CORNWALL HOSPITAL, Greenbank-road, PLYMOUTH. HOUSE PHYSICIANS, pre-registration posts, vacancies 1st and 14th January, 1959.

Apply with names of 3 referees, also stating age, nationality, qualifications and experience, to the Group Secretary, 7, Nelson-gardens, Plymouth.

PLYMOUTH. SOUTH DEVON AND EAST CORNWALL HOSPITAL, FREEDOM FIELDS. Central Casualty Department. Resident Locum SENIOR HOUSE OFFICER in Casualty, vacant immediately. Recognised for the F.R.C.S.

Applications, with names of 3 referees, to be sent to the Group Secretary.

PLYMOUTH. SOUTH DEVON AND EAST CORNWALL HOSPITAL.

HOUSE SURGEON, pre-registration post, vacant 1st December, 1958. Devonport Section.

HOUSE SURGEONS, pre-registration posts, vacancies, 2 on 1st January, 1959. Freedom Fields Section.

HOUSE SURGEONS, pre-registration posts, vacancies 1 immediately, and 9th January, 1959. Greenbank-road Section.

All posts are recognised for the F.R.C.S.

Apply with names of 3 referees, also stating age, nationality, qualifications and experience to the Group Secretary, 7, Nelson-gardens, Plymouth.

PONTEFRACT AND CASTLEFORD HOSPITAL MANAGEMENT COMMITTEE. ANÆSTHETIST (Junior Hospital Medical Officer) required for duties at hospitals throughout the Group. Post resident or non-resident.

Applications, giving details of experience and the names and addresses of 2 referees, to the Group Secretary, Great Northern House, Salter-row, Pontefract, Yorkshire.

PONTEFRACT GENERAL INFIRMARY. House Surgeon required. This is an approved pre-registration post under Medical Act, 1950, but applications will be considered from fully registered practitioners. Hospital approved under F.R.C.S. regulations and provides excellent surgical experience. Married accommodation available. Post vacant 19th December, 1958.

Applications as soon as possible to the Secretary, Pontefract and Castleford Hospital Management Committee, Great Northern House, Salter-row, Pontefract, Yorkshire.

RHYMNEY AND SIRHOWY VALLEYS HOSPITAL MANAGEMENT COMMITTEE.

St. James Hospital, Tredegar, Monmouthshire (38 general medicine, 43 chronic sick, and 43 obstetric beds). Married quarters.

OBSTETRIC HOUSE OFFICER (1st February).

Tredegar General Hospital (Surgical Unit of 50 Beds plus 6 orthopædic beds under daily supervision of Consultant Surgeon and visiting supervision of Orthopædic Surgeon. Busy Outpatient, Casualty, and Radiological Departments.) Married quarters.

HOUSE SURGEON (1st February) with opportunity to follow on to a House Physician or House Officer (obstetrics) if satisfactory.

Caerphilly District Hospital (acute general hospital, 226 Beds), 6 miles from Cardiff. Married quarters may be available. Vacancies on 1st February.

2 HOUSE SURGEONS, 1 with duties also in Orthopædic Department. Both recognised for F.R.C.S.

HOUSE PHYSICIAN.

Applications to the Group Secretary, Central Offices, Caerphilly-road, Ystrad Mynach, Hengoed, Glamorgan.

ROCHDALE AND DISTRICT HOSPITAL MANAGE-MENT COMMITTEE. SENIOR HOUSE OFFICER (medicine) (Assistant Resident Medical Officer) required immediately at Birch Hill General Hospital. Resident staff includes Registrar (Resident Medical Officer), and 3 House Physicians.

Apply at once to Group Secretary, Central Offices, Birch Hill Hospital, Rochdale, Lancs.

ROCHDALE AND DISTRICT HOSPITAL MANAGE-MENT COMMITTEE. HOUSE PHYSICIANS required at Birch Hill Hospital. 3 resident posts available in December/January.

Apply at once to Group Secretary, Central Offices, Birch Hill Hospital, Rochdale, Lancs.

ROCHFORD, ESSEX. GENERAL HOSPITAL. (620 Beds.) Locum PSYCHIATRIC REGISTRAR required on month-to-month basis pending appointment being filled by the Regional Hospital Board, commencing approximately 15th December, 1958.

Applications to the Secretary as soon as possible.

ROCHFORD GENERAL HOSPITAL. (620 Beds.) Applications are invited for the appointment of SENIOR HOUSE OFFICER (surgery). Post recognised for F.R.C.S., and is resident. Vacant 1st December, 1958.

Applications, stating age, &c., to reach the Secretary immediately.

ROMFORD, ESSEX. OLDCHURCH HOSPITAL. RESIDENT PATHOLOGIST (Senior House Officer grade). This post, now vacant, provides valuable experience by rotation through all departments of this large Group Laboratory and is recognised for the purposes of the Diploma in Pathology. Prospective candidates are invited to visit the laboratory.

Applications should be sent, with testimonials or the names of 2 referees, as soon as possible to the Secretary, Romford Group Hospital Management Committee, Oldchurch Hospital, Romford,

ROMFORD, ESSEX. OLDCHURCH HOSPITAL. (722 Beds.) RESIDENT HOUSE SURGEONS (2) required, 1 immediately and 1 on 3rd December next, in the General Surgical Unit. Recognised for F.R.C.S. Open to either pre-registration applicants or to fully registered practitioners. This very active Unit of a total of approximately 180 Beds affords ample opportunities for candidates to obtain first-class tuition and experience. The candidates appointed will be attached to a unit of approximately 60 Beds.

Apply immediately to Group Secretary, Romford Group Hospital Management Committee, Oldchurch Hospital.

ROMFORD, ESSEX. OLDCHURCH HOSPITAL. (722 Beds.) ORTHOPÆDIC HOUSE SURGEON (resident) required in the Orthopædic and Accident Unit. The service consists of 100 Beds equally divided between traumatic surgery and "cold" orthopædics. Post is recognised for pre-registration purposes and for F.R.C.S.

Applications to be sent to Group Secretary, Romford Hospital Management Committee, Oldchurch Hospital, *as* soon as possible.

SALFORD ROYAL HOSPITAL. Salford Hospital Management Committee. RESIDENT CLINICAL PATHOLOGIST required (Senior House Officer grade). Post vacant early February.

Applications, with the names and addresses of 2 referees, to the Secretary, Salford Royal Hospital, Chapel-street, Salford, 3, Lancs.

SCOTLAND. EASTERN REGIONAL HOSPITAL BOARD. Obstetrics and Gynæcology. COUNTY AND CITY OF PERTH GENERAL HOSPITALS. Applications are invited for the post of REGISTRAR in Obstetrics and Gynæcology in the area covered by the County and City of Perth General Hospitals (main hospitals, Perth Royal Infirmary (270 Beds), and Bridge of Earn Hospital (806 Beds)).

Forms of application and further particulars from the Secretary to the Board, 430, Blackness-road, Dundee, with whom applications must be lodged not later than 13th December, 1958.

SCOTLAND. NORTH-EASTERN REGIONAL HOSPITAL BOARD. Applications are invited for the post of SENIOR REGISTRAR in Anæsthetics on the staffs of the Aberdeen General Hospitals and the Aberdeen Special Hospitals. Candidates preferably should hold a higher qualification in Anæsthetics.

Applications, together with the names of 2 referees, should be submitted by 13th December, 1958, to the Senior Administrative Medical Officer, I, Albyn-place, Aberdeen, from whom further particulars and a form of application may be obtained.

SCOTLAND. WESTERN REGIONAL HOSPITAL BOARD. Applications are invited for the appointment, which will be for 1 year in the first instance, of REGISTRAR in General Surgery with duties on a yearly rotational basis at the Victoria Infirmary, Glasgow, and at the Royal Infirmary, Dumfries. Experience will be obtained in other branches of surgery. Housing accommodation available at the Royal Infirmary, Dumfries.

Application (12 copies), stating date of birth, qualifications, experience, present appointment, and the names of 3 referees, to reach the Secretary, Western Regional Hospital Board, 64, West Regent-street, Glasgow, C.2, by 13th December, 1958.

SCUNTHORPE. WAR MEMORIAL HOSPITAL. (262 Beds.) Immediate vacancy for RESIDENT HOUSE SURGEON in General Surgery and Gynæcology (Senior House Officer or pre-registration). This post offers splendid opportunity of experience in modern well-equipped hospital.

Applications, naming 2 referees, to Group Secretary, Scunthorpe Hospital Management Committee.

SEDGEFIELD GENERAL HOSPITAL, Sedgefield, STOCKTON-ON-TEES, CO. DURHAM. (336 Beds.) SENIOR HOUSE OFFICER ANÆSTHETIST required. Married accommodation available, full Consultant staff employed. Post is recognised in connection with higher examinations, and there is provided a good medical library.

Detailed applications and names of 2 referees to the Group Secretary, North Tees-side Hospital Management Committee, at the above address as soon as possible.

SEDGEFIELD GENERAL HOSPITAL, Sedgefield, STOCKTON-ON-TEES. (336 Beds.) Applications are invited for the appointment of JUNIOR HOSPITAL MEDICAL OFFICER in Gynæcology. Modern unit of 25 Beds, and post offers excellent experience in gynæcology and obstetrics. Full Consultant staff; married accommodation available; good medical library.

Detailed applications, together with the names of 2 referees, to the Group Secretary, North Tees-side Hospital Management Committee, at the above address as soon as possible.

SHEFFIELD. THE UNITED SHEFFIELD HOSPITALS. Applications invited for the following posts:—

(*a*) SENIOR REGISTRAR in Ophthalmology, duties primarily at the Royal Infirmary.
Closing date for applications 2nd December, 1958.
(*b*) SENIOR REGISTRAR in Orthopædics at the Royal Infirmary.
Closing date for applications 5th December, 1958.
(*c*) SENIOR HOUSE OFFICER (resident) to the Thoracic Unit, Royal Infirmary. Post vacant 15th January, 1959.
Closing date for applications 12th December, 1958.
(*d*) 2 RESIDENT HOUSE SURGEONS, Children's Hospital. Posts vacant from 15th January, 1959.
Closing date for applications 12th December, 1958.

Applications for posts (*a*) and (*b*) with names of 3 referees to Chief Administrative Officer, United Sheffield Hospitals, West-street, Sheffield, 1.

Applications for posts (*c*) and (*d*) with names of 3 referees or copy testimonials to :—

(*c*) Superintendent, Royal Infirmary, Sheffield, 6.
(*d*) Superintendent, Children's Hospital, Sheffield, 10.

SHEFFIELD. THE UNITED SHEFFIELD HOSPITALS. Applications invited for the non-resident post of REGISTRAR in Ophthalmology at the Royal Infirmary. Post vacant 19th January, 1958.

Applications, with the names of 3 referees, should be sent not later than 12th December, 1958, to the Chief Administrative Officer, United Sheffield Hospitals, West-street, Sheffield, 1.

SHEFFIELD. THE UNITED SHEFFIELD HOSPITALS. ROYAL HOSPITAL. Applications invited for the post of SENIOR HOUSE OFFICER to the Department of Neurology. Post vacant now. This is a large Neurological Department in a Teaching Hospital Group. Post offers wide experience and opportunities for postgraduate training and for attending postgraduate teaching in other departments.

Applications, stating age, qualifications and experience, with the names of 3 referees should be sent not later than 9th December, 1958, to the Superintendent, Sheffield, 1.

SHREWSBURY. ROYAL SALOP INFIRMARY. (216 Beds.) HOUSE PHYSICIAN. Pre-registration candidates eligible. Vacant immediately. Married accommodation available.

Applications, with copy testimonials, to Group Secretary, Shrewsbury Hospital Group, Royal Salop Infirmary, Shrewsbury.

SHREWSBURY. ROYAL SALOP INFIRMARY AND COPTHORNE HOSPITAL. (500 Beds.) SENIOR HOUSE OFFICER (gynæcological). 50 gynæcological beds and 2 House Surgeons. Posts recognised for M.R.C.O.G. Vacant early January, 1959.

Applications, with copy testimonials, to Group Secretary, Shrewsbury Hospital Group, Royal Salop Infirmary, Shrewsbury.

SHREWSBURY. ROYAL SALOP INFIRMARY AND COPTHORNE HOSPITAL. (500 Beds.) RESIDENT ANÆSTHETIST (Senior House Officer). Post recognised for F.F.A. R.C.S. Registrar also employed. Vacant 24th January, 1959.

Applications and copy testimonials to Group Secretary, Shrewsbury Hospital Group, Royal Salop Infirmary, Shrewsbury.

SHREWSBURY. ROYAL SALOP INFIRMARY/COPTHORNE HOSPITAL. (500 Beds.) Senior House Officer to work as CLINICAL PATHOLOGIST to Group Laboratory. Appointment tenable for 1 year, resident or non-resident. Recognised for Diploma in Pathology. Vacant 1st January, 1959. A Unit of the Public Health Laboratory service is housed in the same building and there are facilities for training in all the 4 main branches of pathology.

Applications to Group Secretary, Shrewsbury Hospital Group, Royal Salop Infirmary, Shrewsbury, naming 3 referees.

SLOUGH, BUCKINGHAMSHIRE. UPTON HOSPITAL. Locum HOUSE SURGEON required from 8th December to 4th January.

Applications, with names of 2 referees, to Secretary.

SOUTHAMPTON CHILDREN'S HOSPITAL. (Recognised by Conjoint Board for D.C.H.). HOUSE OFFICER required. Total establishment of 3 Residents. Salary, &c., as nationally advocated.

Applications, with copies of testimonials, to Group Secretary, Southampton Group Hospital Management Committee, Bullar-street, Southampton.

SOUTHAMPTON EYE HOSPITAL. (32 Beds. Recognised for D.O. examination.) RESIDENT SENIOR HOUSE OFFICER required end of December.

Applications, with copies of testimonials, should be forwarded as soon as possible to the Secretary, Southampton Group Hospital Management Committee, Bullar-street.

SOUTHAMPTON GENERAL HOSPITAL. (465 Beds. Recognised for F.R.C.S.) RESIDENT HOUSE SURGEON required. Pre-registration candidate eligible.

Applications should be forwarded to the Group Secretary, Southampton Group Hospital Management Committee, Bullar-street, Southampton, with copies of recent testimonials.

SOUTHAMPTON GENERAL HOSPITAL. South West METROPOLITAN REGIONAL HOSPITAL BOARD. Applications are invited for the appointment of Whole-time SURGICAL REGISTRAR to the above Hospital. Post will normally be tenable for 2 years, but subject to review at the end of the first year. Candidates may visit the Hospital, by arrangement, if they so desire.

Forms of application may be obtained from the undersigned, to whom they should be returned not later than 10th December, 1958, and candidates should state in their initial application if they wish to be considered on a Locum basis until a permanent appointment is made.

FRANK JENNINGS, Group Secretary,
Southampton Group Hospital Management Committee.
Bullar-street, Southampton.

SOUTH EAST METROPOLITAN REGIONAL HOSPITAL BOARD. Applications are invited for an appointment as Whole-time REGISTRAR in Ophthalmology to fill a vacancy in the Brighton and Lewes Group of hospitals, for duties mainly at the Sussex Eye Hospital, Eastern-road, Brighton, 7, available on 1st March, 1959. The post is recognised for the F.R.C.S. and D.O. and may be either resident or non-resident; no accommodation is available for a married practitioner. The appointment will be in accordance with the terms and conditions of service of hospital medical and dental staff (England and Wales), and will be for 1 year in the first instance.

Applications, giving particulars of age, qualifications and experience, with relevant dates, together with the names and addresses of 2 referees, to be sent to the Secretary, Registrars Committee, South East Metropolitan Regional Hospital Board, 40, Eastbourne-terrace, London, W.2, not later than 13th December, 1958.

SOUTH EAST METROPOLITAN REGIONAL HOSPITAL BOARD. Applications are invited for an appointment as Whole-time REGISTRAR in Pathology to fill a vacancy in the Brighton and Lewes Group of hospitals. The post is non-resident but the successful candidate will be expected to reside near the Royal Sussex County Hospital and to take a share of emergency duties in the group. This post is recognised for the Diploma in Pathology. The appointment will be in accordance with the terms and conditions of service of hospital medical and dental staff (England and Wales), and will be for 1 year in the first instance.

Applications, giving particulars of age, qualifications and experience, with relevant dates, together with the names and addresses of 2 referees, to be sent to the Secretary, Registrars Committee, South East Metropolitan Regional Hospital Board, 40, Eastbourne-terrace, W.2, not later than 13th December, 1958.

SOUTH EAST METROPOLITAN REGIONAL HOSPITAL BOARD. Applications are invited for an appointment as Whole-time REGISTRAR in E.N.T. Surgery to fill a vacancy in the Brighton and Lewes Group of hospitals. This post is recognised for the D.L.O. The appointment will be in accordance with the terms and conditions of service of hospital medical and dental staff (England and Wales), and will be for 1 year in the first instance.

Applications, giving particulars of age, qualifications and experience, with relevant dates, together with the names and addresses of 2 referees, to be sent to the Secretary, Registrars Committee, 40, Eastbourne-terrace, W.2, not later than 13th December, 1958.

SOUTH EAST METROPOLITAN REGIONAL HOSPITAL BOARD. Applications are invited for an appointment as Whole-time REGISTRAR in Anæsthetics to fill a vacancy in the Bromley Group of hospitals. The appointment will be in accordance with the terms and conditions of service of hospital medical and dental staff (England and Wales), and will be for 1 year in the first instance.

Applications, giving particulars of age, qualifications and experience, with relevant dates, together with the names and addresses of 2 referees, to be sent to the Secretary, Registrars Committee, South East Metropolitan Regional Hospital Board, 40, Eastbourne-terrace, London, W.2, not later than 13th December, 1958.

SOUTHEND. GENERAL HOSPITAL. (262 Beds.) HOUSE SURGEON (pre-registration) required. Post vacant 17th December, 1958.

Applications, stating age, qualifications and previous experience, with copies of recent testimonials (1 testimonial sufficient from applicants for first appointment), should reach the Secretary by 5th December, 1958.

SOUTHPORT GENERAL INFIRMARY. (189 Beds.) JUNIOR HOSPITAL MEDICAL OFFICER (resident). Whole-time casualty appointment. Post vacant mid-January.

Apply, with 2 copy testimonials, to Group Secretary, Southport and District Hospital Management Committee, Promenade Hospital, Southport.

SOUTHPORT GENERAL INFIRMARY. (189 Beds. Recognised for pre-registration.)

HOUSE PHYSICIAN (general medicine).
HOUSE PHYSICIAN (general medicine and ophthalmology).
HOUSE SURGEON (general surgery).
HOUSE SURGEON (general surgery and gynæcology).

Appointments vacant January. House Surgeon posts recognised for F.R.C.S.

Apply, stating age, qualifications, nationality, experience, and post required, with 2 copy testimonials, to Group Secretary, Southport and District Hospital Management Committee, Promenade Hospital, Southport.

STAFFORD. STAFFORDSHIRE GENERAL INFIRMARY. (175 Beds—Recovery Unit 32 Beds.) HOUSE SURGEON. Pre-registration post. Vacant January. At end of service the successful applicant will be considered for pre-registration post of House Physician if he or she has not held such an appointment.

Applications to Group Secretary, Stafford Hospital Management Committee, 13, Foregate-street, Stafford.

STAFFORD. STAFFORDSHIRE GENERAL INFIRMARY. RESIDENT CASUALTY OFFICER required. Junior Hospital Medical Officer status.

Applications, with names for reference, to Group Secretary, Stafford Hospital Management Committee, 13, Foregate-street, Stafford.

ST. ALBANS CITY HOSPITAL, St. Albans, Hertfordshire. (384 Beds.) SENIOR HOUSE OFFICER, resident, required for the Gynæcological and Obstetric Departments. Post recognised for D.Obst.R.C.O.G. and vacant about 8th December, 1958.

Applications to Secretary, Mid Herts Group Hospital Management Committee, Bleak House, Catherine-street, St. Albans.

ST. ALBANS CITY HOSPITAL. (384 Beds.) North WEST METROPOLITAN REGIONAL HOSPITAL BOARD. CASUALTY REGISTRAR required. Post recognised for F.R.C.S. regulations. Appointment tenable for 6 months from 1st January, 1959, and subject to review at end of this period.

Application forms obtainable from and returnable to Secretary, Mid-Herts Group Hospital Management Committee, Bleak House, Catherine-street, St. Albans, Herts.

ST. LEONARDS-ON-SEA. BUCHANAN HOSPITAL. (91 Beds. Obstetric, Gynæcological and Premature Baby Unit.) SENIOR HOUSE OFFICER required for Obstetric and Premature Baby Unit. Appointment, recognised for M.R.C.O.G., is vacant 8th January, 1959.

Applications, giving names and addresses of 3 referees, should be addressed to the Hospital Administrator.

ST. LEONARDS-ON-SEA. BUCHANAN HOSPITAL. (91 Beds.) Locum HOUSE SURGEON (gynæcology) required from 22nd to 28th December inclusive. Salary £10 9s. a week, less board.

Apply, with names of 2 referees, to the Administrator, Buchanan Hospital, St. Leonards-on-Sea.

STOCKPORT AND BUXTON HOSPITAL MANAGEMENT COMMITTEE. Applications are invited for the following pre-registration posts :—

Stockport Infirmary (163 Beds)
HOUSE OFFICER (surgery), vacant now.
HOUSE OFFICER (surgery), vacant 1st January, 1959.
HOUSE OFFICER (surgery), vacant 6th January, 1959.
These 3 posts are recognised for the F.R.C.S.

Stepping Hill Hospital, Stockport (529 Beds)
HOUSE OFFICER (medicine), vacant 1st February, 1959.
HOUSE OFFICER (medicine), vacant 24th March, 1959.
HOUSE OFFICER (obstetrics), vacant 1st March, 1959. (Recognised for D.Obst.R.C.O.G.)
HOUSE OFFICER (surgery), vacant now.

Applications, with full particulars and copies of 2 testimonials, to be sent to the Group Secretary, 59B, Shaw Heath, Stockport.

STIRLING AND CLACKMANNAN HOSPITALS BOARD OF MANAGEMENT. There is a vacancy for a SENIOR HOUSE OFFICER in Surgery at Clackmannan County Hospital, Alloa. Married accommodation is available.

Applications, with 2 names for reference, should be sent to the Group Medical Superintendent, Stirling Royal Infirmary, from whom further particulars can be obtained.

STOKE-ON-TRENT. CITY GENERAL HOSPITAL. (815 Beds.) STOKE-ON-TRENT HOSPITAL MANAGEMENT COMMITTEE. HOUSE SURGEON (general surgery) required. Pre-registration post vacant now. Recognised for F.R.C.S. No casualty work.

Applications to the Hospital Secretary.

STOKE-ON-TRENT. NORTH STAFFORDSHIRE ROYAL INFIRMARY. (455 Beds.) SENIOR HOUSE OFFICER (orthopædics) required. Post vacant very shortly. Some duties also at Hartshill Orthopædic Hospital.

Detailed applications, with copy testimonials, to Hospital Secretary.

STOKE-ON-TRENT. NORTH STAFFORDSHIRE ROYAL INFIRMARY. HOUSE OFFICERS (general surgery) required. Pre-registration. 2 posts vacant early January. Recognised for F.R.C.S.

Detailed applications, with copy testimonials, to Hospital Secretary, North Staffordshire Royal Infirmary, Stoke-on-Trent.

STRATFORD-ON-AVON GENERAL HOSPITAL. (163 Beds.) SENIOR HOUSE OFFICER (Resident Medical Officer) required. Post vacant January, 1959. Duties on medical wards under supervision of Consultant staff. Appointment gives good experience in general medicine and is suitable for one working for a higher qualification. 3 other resident staff.

Applications, giving qualifications and experience, together with copies of 2 testimonials, to Hospital Secretary.

STRATFORD-ON-AVON HOSPITAL. (163 Beds.) Resident HOUSE SURGEON. Excellent experience.

Applications from fully registered or pre-registration applicants, with 2 recent testimonials, to Hospital Secretary.

SUTTON. BELMONT HOSPITAL. St. Ebba's and BELMONT GROUP HOSPITAL MANAGEMENT COMMITTEE. SOUTH WEST METROPOLITAN REGIONAL HOSPITAL BOARD. Applications are invited for appointment of PSYCHIATRIC REGISTRAR at above Hospital, which is principally concerned with the treatment of neuroses and the early psychoses. There are ample opportunities for research and the Hospital, which is recognised for the D.P.M., takes an active part in teaching in association with teaching hospitals. Candidates may visit the Hospital by appointment with the Medical Administrator.

Application forms may be obtained from the Group Secretary, Group Office, Belmont Hospital, Brighton-road, Sutton, Surrey, and completed forms (5 copies) should be returned to him within 2 weeks of the appearance of this advertisement.

SWANSEA HOSPITAL, Swansea. (413 Beds.) Glantawe HOSPITAL MANAGEMENT COMMITTEE. Applications are invited for the resident post of SENIOR HOUSE OFFICER in the E.N.T. Department of the above Hospital. Vacancy 27th December, 1958. The Hospital is recognised under the regulations for the F.R.C.S. (E.N.T.) and the D.L.O.

Applications, stating age, qualifications and experience, together with the names of 2 referees, should be forwarded to the Hospital Secretary by 8th December, 1958.

T. E. JONES, Group Secretary.

SWANSEA HOSPITAL, Swansea. (413 Beds.) Glantawe HOSPITAL MANAGEMENT COMMITTEE. Applications are invited for the resident post of SENIOR HOUSE OFFICER in the Traumatic and Orthopædic Department of the above Hospital. Vacancy 1st January, 1959. The post is recognised under the F.R.C.S. regulations for 6 months' casualty training. It offers exceptional experience in all aspects of traumatic surgery as occurring in a large industrial centre and port.

Applications, stating age and experience, together with copies of 2 recent testimonials, should be forwarded to the Hospital Secretary by 8th December, 1958.

T. E. JONES, Group Secretary.

SWANSEA HOSPITAL, Swansea. (412 Beds.) Glantawe HOSPITAL MANAGEMENT COMMITTEE. Registered medical practitioners are invited to apply for the resident appointment of SENIOR HOUSE OFFICER in the Ophthalmic Department of the above Hospital. Immediate vacancy. The post is recognised for the F.R.C.S.(Eng.) and D.O. examinations.

Applications, stating age, qualifications and experience, together with copies of 2 recent testimonials, should be sent to the Hospital Secretary. T. E. JONES, Group Secretary.

SWANSEA HOSPITAL, Swansea. (412 Beds.) Glantawe HOSPITAL MANAGEMENT COMMITTEE. Applications are invited for the locum appointment of CASUALTY OFFICER of Junior Hospital Medical Officer grade at the above Hospital, for the period 22nd December, 1958–12th January, 1959, inclusive.

Applications, giving full particulars, should be sent to the Hospital Secretary. T. E. JONES, Group Secretary.

TAPLOW, near MAIDENHEAD. CANADIAN RED CROSS MEMORIAL HOSPITAL. HOUSE SURGEON required for post vacant 22nd December. Pre-registration post.

Applications, stating age, qualifications with dates, with copies of 2 testimonials, to Secretary.

TAUNTON AND SOMERSET HOSPITAL. Locum HOUSE OFFICER (gynæcology and obstetrics) required for approximately 6 weeks from 3rd December, 1958.

Applications, stating age, nationality, &c., to the Group Secretary, Taunton Hospital Management Committee, c/o Musgrove Park Hospital, Taunton, immediately.

TAUNTON AND SOMERSET HOSPITAL, Taunton, SOMERSET. HOUSE OFFICER (general surgery) required. Pre-registration post. Recognised for F.R.C.S. Post vacant 14th January, 1959.

Applications, stating age, nationality and qualifications, together with the names of 2 referees, should be forwarded to the Group Secretary, Taunton Hospital Management Committee, Musgrove Park Hospital, Taunton.

TAUNTON AND SOMERSET HOSPITAL, Taunton, SOMERSET. HOUSE OFFICER (E.N.T.) required. Post vacant early January. Post-registration appointment, recognised for F.R.C.S. and D.L.O.

Applications, stating age, nationality and qualifications, together with the names of 2 referees, should be forwarded to the Group Secretary, Taunton Hospital Management Committee, c/o Musgrove Park Hospital, Taunton.

TAUNTON AND SOMERSET HOSPITAL, Taunton, SOMERSET. SENIOR HOUSE OFFICER (anæsthetics) required. Post, vacant early December, is recognised for F.F.A.R.C.S. and D.A. A Registrar in Anæsthetics is also employed in the South Somerset Clinical Area, in which the above is the principal General Hospital.

Applications, stating age, nationality, experience in anæsthetics (if any), together with the names of 2 referees, to the Group Secretary, Taunton Hospital Management Committee, Musgrove Park Hospital, Taunton.

TILBURY AND RIVERSIDE GENERAL HOSPITAL, ORSETT BRANCH, ORSETT, ESSEX. Applications are invited for the post of RESIDENT ORTHOPÆDIC HOUSE SURGEON at the above Hospital. The post is recognised under the Medical Act for pre-registration purposes, and suitable candidates are invited to apply. There exists a new Casualty Reception Unit at this Hospital. The appointment, which becomes vacant immediately, is for 6 months in the first instance.

Applications, together with copies of recent testimonials, should be forwarded to the undersigned.

G. E. WHYTE, Group Secretary,
Tilbury and South East Essex
Hospital Management Committee.

Thurrock Hospital, Grays, Essex.

TORQUAY. TORBAY HOSPITAL. (180 acute general beds.) HOUSE OFFICER (medicine), Male or Female, required for last week of November. Pre-registration appointment. General duties which will include some work in the E.N.T., the Ophthalmic, and Radiotherapy Departments.

Applications, stating qualifications, nationality, age, together with copy testimonials (quoting reference F.955/91), to the Group Secretary, Torquay District Hospital Management Committee, Torbay Hospital, Torquay, S. Devon.

WAKEFIELD. PINDERFIELDS GENERAL HOSPITAL. REGIONAL THORACIC CENTRE. Applications invited for SENIOR HOUSE PHYSICIAN and SENIOR HOUSE SURGEON. Salary £819 10s. p.a. £150 p.a. charged for accommodation. Married accommodation available.

Address written applications, giving full personal particulars, details of experience, and 2 names and addresses for reference, to W. BOWRING, Group Secretary, Pinderfields General Hospital, Wakefield.

WAKEFIELD. PINDERFIELDS GENERAL HOSPITAL. REGIONAL THORACIC CENTRE. Applications invited for position of JUNIOR HOSPITAL MEDICAL OFFICER. Salary scale £852 10s.–£55–£1182 10s. p.a. £170 p.a. charged for accommodation. Married accommodation available.

Address written applications, giving full personal particulars, details of experience and 2 names and addresses for reference, to W. BOWRING, Group Secretary, Pinderfields General Hospital, Wakefield.

WARRINGTON INFIRMARY. (172 Beds.) Applications are invited for the post of RESIDENT ANÆSTHETIST (Male or Female) (graded as Senior House Officer). The post will be vacant early in January. The Hospital is recognised for the D.A. examination. Salary is £819 10s. p.a., less a deduction of £150 p.a. for residential emoluments.

Applications, stating qualifications and experience, should be sent to HENRY L. BOOT, Group Secretary, Warrington and District Hospital Management Committee, c/o General Hospital, Warrington, Lancs.

WARWICK (near). KING EDWARD VII MEMORIAL CHEST HOSPITAL. (228 Beds.) JUNIOR HOSPITAL MEDICAL OFFICER or SENIOR HOUSE OFFICER (thoracic surgery, resident), according to experience. Modern thoracic surgical unit with all forms of major and minor thoracic surgery undertaken. Post offers wide general training in cardiac, œsophageal and pulmonary surgery, mostly non-tuberculous. Facilities available for postgraduate study, recognised for F.R.C.S. Previous experience specialty not essential.

Applications to Medical Superintendent.

WATFORD. SHRODELLS HOSPITAL. Applications are invited for the post of GYNÆCOLOGICAL HOUSE OFFICER (Junior Hospital Medical Officer grade), to take up duty early January. Post recognised for the M.R.C.O.G.

Applications, together with copies of 2 testimonials, should reach the Medical Administrator as soon as possible.

WATFORD. SHRODELLS HOSPITAL. (General Hos-pital—380 Beds.) Applications are invited for the post of SENIOR HOUSE OFFICER to the Geriatric Unit. Resident or non-resident. This unit of 180 Beds, under a full-time Consultant Geriatrician, offers excellent clinical experience in diagnosis and treatment of acute and other illnesses in the elderly. Full laboratory and radiological facilities. Adequate time for reading.

Applications, together with copies of not more than 2 testimonials, should reach the Medical Administrator as soon as possible.

WATFORD. SHRODELLS HOSPITAL. (380 Beds.) Applications are invited for the post of HOUSE PHYSICIAN (pre- or post-registration), to take up duty early January.

Applications, with copies of 2 recent testimonials, should reach the Medical Officer-in-charge as soon as possible.

WINDSOR. KING EDWARD VII HOSPITAL. House SURGEON in General Surgery required, Male or Female, for post vacant 2nd January. Recognised for F.R.C.S. Pre-registration post.

Applications, with copies of recent testimonials, stating age, nationality, qualifications, with dates, to Secretary.

WINDSOR. KING EDWARD VII HOSPITAL. House SURGEON in General and Orthopædic Surgery required, Male or Female. Recognised for F.R.C.S. Pre-registration post.

Applications, stating age, nationality, qualifications, with dates, and copies of recent testimonials, to Secretary.

WELSH REGIONAL HOSPITAL BOARD.

REGISTRAR in General Surgery, Llanelly. Resident—single accommodation.

REGISTRAR (obstetrics and gynæcology), to serve Mid-Glamorgan Hospital Management Committee. Based at Bridgend General Hospital. May also be expected to serve other hospitals within Group. Post recognised for M.R.C.O.G. Resident or non-resident.

REGISTRAR in Anæsthetics, Glantawe Hospital Management Committee area. Visits to main hospitals in group, including Swansea (403 Beds), Morriston (501 Beds), and Llanelly (162 Beds).

2 REGISTRARS in Plastic Surgery, St. Lawrence Hospital, Chepstow (182 Beds). Expected to visit other hospitals in South Wales area. Considerable opportunities for training in specialty. Accommodation for single person.

Subject to review end of first year.

Application forms from Senior Administrative Medical Officer, Temple of Peace, Cathays Park, Cardiff, within 14 days.

WESTON-SUPER-MARE GENERAL HOSPITAL. (104 Beds.) Applications are invited from duly qualified medical practitioners for the pre-registration appointment of HOUSE PHYSICIAN. Single residential accommodation provided. Vacant January, 1959.

Applications, stating age, qualifications, together with names and addresses of 2 referees, should be addressed to the Group Secretary, Weston-super-Mare Hospital Management Committee.

WINCHESTER. ROYAL HAMPSHIRE COUNTY HOS-PITAL. (324 Beds.) SENIOR HOUSE OFFICER (orthopædics) required. Post recognised F.R.C.S. Wide experience under area orthopædic team. Appointment for 6 months in first instance. Vacant 13th December, 1958.

Applications, with copies of 2 testimonials, to the Hospital Secretary.

WINCHESTER. ROYAL HAMPSHIRE COUNTY HOS-PITAL. (324 Beds.) SENIOR HOUSE OFFICER, Pathological Department. Vacant 1st January, 1959. Preferably resident. Duties will include training in the various branches of clinical pathology, especially hæmatology. Previous experience in clinical pathology desirable, but not essential.

Applications, with copies of 2 testimonials, to the Hospital Secretary.

WOKING, SURREY. VICTORIA HOSPITAL. (72 Beds.) SENIOR HOUSE OFFICER (post-registration appointment) required for medical, surgical and casualty duties.

Apply, with 2 testimonials, to Hospital Secretary.

WOLVERHAMPTON. THE ROYAL HOSPITAL. (An Associated Hospital of the Birmingham University Medical School.) Pre-registration HOUSE OFFICER (pædiatrics). Post recognised for D.C.H. Vacant 26th January, 1959.

Apply, with copies of 2 testimonials, to the Secretary.

WORCESTER ROYAL INFIRMARY. House Surgeon (pre-registration or otherwise) required for General Surgery post at this busy general hospital of 213 Beds. The appointment offers wide and varied experience and is recognised for the F.R.C.S. examinations.

Applications to Hospital Secretary.

WORKINGTON INFIRMARY, Cumberland. (174 Beds, pre-registration post, recognised F.R.C.S.(Ed.).) HOUSE SURGEON (first, second, or Senior House Officer post). Vacant beginning of November.

Detailed applications, with dates and names of 2 referees, to Group Secretary.

WORTHING HOSPITAL, Lyndhurst-road, Worthing, SUSSEX. Applications are invited from registered medical practitioners for the appointment of SENIOR HOUSE OFFICER (surgical), vacant mid-December. This post offers wide experience in general surgery and is recognised for F.R.C.S.

Applications, stating age, qualifications, nationality and experience, together with copies of 2 recent testimonials, to Hospital Secretary as soon as possible.

A. V. OAKTON, Group Secretary,
Worthing Group Hospital Management Committee.

MICHIGAN, U.S.A. OAKWOOD HOSPITAL, Dearborn, MICHIGAN. Applications are invited for 1- or 2-year approved GENERAL PRACTICE RESIDENCY in modern 234-Bed general hospital 10 miles from Detroit. Excellent facilities. Hospital approved for Exchange-Visitor programme. Beginning monthly salary $250 if single, $300 if married. Free housing.

Apply: Director.

U.S.A. ST. LUKE'S HOSPITAL, Milwaukee, Wis-CONSIN, is considering applications for INTERNSHIP and RESIDENCIES. The hospital is a very active 250-Bed institution which is fully accredited by the Joint Commission on Accreditation of Hospitals and is approved for internships by the A.M.A. and for the following residencies: 4 years in Pathology, 3 years in Radiology, 2 years in General Practice, 1 year in Medicine, Surgery and Obstetrics/Gynæcology. Salaries: Interns: $250 per month. Residents: $325 per month the first year and increments of $50 per month each successive year. Loans may be arranged to cover transportation costs.

Please address your inquiry to the Medical Coordinator, St. Luke's Hospital, West Oklahoma-avenue at S. 29th Street, Milwaukee 15, Wisconsin.

U.S.A. WASHINGTON, D.C. Rotating Interns. 225-bed general hospital, Washington, D.C., suburb, near U.S. Naval Medical Center and National Institutes of Health. Stipend $100–$150 per month, plus full maintenance and laundry of uniforms. Credentials must be evaluated by Educational Council for Foreign Medical Graduates.

Apply Suburban Hospital, Bethesda, Maryland.

U.S.A. SAINT ELIZABETH HOSPITAL, Elizabeth, NEW JERSEY. 1-year ROTATING INTERNSHIP, A.M.A. approved. New programme in Community-Teaching Hospital. Medical Education and Research Department staffed by 35 carefully-selected Physicians who provide bedside and lecture teaching in specialties. Full-time staff members in pathology, medical education, radiology, all of whom have university faculty appointments. All patients teaching cases—active service department and clinics for interns. Courses available nearby Graduate Medical School, several conducted in Hospital, tuition paid by Hospital. Interns invited twice monthly for grand rounds at outstanding New York hospitals. Hospital located 20 miles from New York City. Limited vacancies for period 1st July, 1959–30th June, 1960. $125 monthly and maintenance.

Write: CHARLES R. REAM, M.D., Saint Elizabeth Hospital, Elizabeth 2, New Jersey.

Public Appointments

H.M. TREASURY MEDICAL SERVICE. Applications are invited for 2 temporary posts for MEDICAL OFFICERS, 1 in London and 1 in Leeds. Applicants must be British subjects and registered medical practitioners. They should have had good clinical experience and preferably administrative experience in occupational health. Salary in the range of £1825 p.a. (London) at age 35 to £2350 p.a.

Apply in writing, giving full particulars of qualifications and experience, to Ministry of Labour and National Service, Professional and Executive Register, Farringdon-street, London, E.C.4, quoting P.E.2223. Only candidates selected for interview will be advised.

LONDON COUNTY COUNCIL. Applications invited from medical practitioners practising in Mayford district of Woking under National Health Service for appointment as VISITING MEDICAL OFFICER to Mayford Approved School accommodating 100 boys, and Mythe House Special School for 14 boys. Remuneration £125 a year plus fees receivable from Executive Council in respect of boys and resident staff taken on National Health Service list.

Particulars and application form from Medical Officer of Health (PH/D.1/2306), County Hall, S.E.1. Closing date 10th December.

ATOMIC ENERGY RESEARCH ESTABLISHMENT, HARWELL. The United Kingdom Atomic Energy Authority have a vacancy at Atomic Energy Research Establishment, Harwell, Berks, for a MEDICAL OFFICER with experience in industrial medicine, outpatient and general practice; a Diploma in Industrial Health would be an advantage. Starting salary between £1875 (at age 35) (with reductions for earlier entry) and £2400 at 40 or over. There are housing and superannuation schemes.

Further details may be obtained from the Group Recruitment Officer (1280/75), Atomic Energy Research Establishment, Harwell, Berks.

BRIGHTON. COUNTY BOROUGH OF BRIGHTON. HEALTH DEPARTMENT. Applications invited from registered medical practitioners (either sex) for the whole-time appointment of SENIOR ASSISTANT MEDICAL OFFICER OF HEALTH. Salary £1605–£105–£1710.

Applicants must hold the D.P.H. and should:—

(1) Have had 2 years' experience in obstetric and child welfare work.

(2) Have been approved by the Ministry of Education for the ascertainment of educationally subnormal children.

Application forms and conditions of appointment from the Medical Officer of Health, Royal York Buildings, Brighton, 1.

Town Hall, Brighton, 1. W. O. DODD, Town Clerk.

CAMBRIDGE. COUNTY OF CAMBRIDGE. Whole-time District Medical Officer of Health and Deputy County Medical Officer. Applications are invited from duly qualified and registered medical practitioners who possess a Diploma in Public Health, Sanitary Science, or State Medicine for the joint appointment of Whole-time DISTRICT MEDICAL OFFICER OF HEALTH for the County Districts of Cambridgeshire (namely, the Rural Districts of Chesterton, South Cambridgeshire and Newmarket) and DEPUTY COUNTY MEDICAL OFFICER AND DEPUTY PRINCIPAL SCHOOL MEDICAL OFFICER. The appointment will be determinable by 3 months' notice on either side. As District Medical Officer of Health, the officer will be responsible for performing his her duties to the Rural District Councils. As Deputy County Medical Officer he she will act under the general control and supervision of the County Medical Officer of Health, and will be required to perform such duties as Deputy Principal School Medical Officer and such other duties as the County Council prescribe. The salary will be £2100 p.a. rising by 5 increments to a maximum of £2400, or such other salary as may be determined by any national agreement. Travelling and subsistence allowances will be payable in accordance with the County Council scale. The appointment is subject to superannuation and the successful applicant will be required to pass a medical examination. The appointment of District Medical Officer of Health is subject to the provisions of Section 110 of the Local Government Act, 1933, and the Sanitary Officers (Outside London) Regulations 1951.

Applications for the appointment, duly endorsed, should also state the names and addresses of 3 referees, and be addressed to the Clerk of the Joint Committee (W. H. HAYWARD) at the County Hall, Hobson-street, Cambridge, not later than 8th December, 1958.

LANCASHIRE COUNTY COUNCIL. Applications are invited from registered medical practitioners for appointments as ASSISTANT DIVISIONAL MEDICAL OFFICER in the Burnley and Lancaster areas. Possession of Diploma in Public Health desirable. Salary £1050 rising to £1475 p.a. Travelling and subsistence allowances where applicable.

Application forms and further particulars from County Medical Officer, Serial 1196, East Cliff County Offices, Preston. Application forms to be returned by 10th December, 1958.

BENFLEET, CANVEY ISLAND, AND RAYLEIGH URBAN DISTRICT COUNCILS. ROCHFORD RURAL DISTRICT COUNCIL. ESSEX COUNTY COUNCIL. Applications invited for the posts of DEPUTY MEDICAL OFFICER OF HEALTH AND ASSISTANT COUNTY MEDICAL OFFICER OF HEALTH which together constitute whole-time, 40% of time being devoted to duties as Deputy Medical Officer of Health to the District Councils and 60% to County Council duties. Applicants must possess the Diploma in Public Health.

Remuneration (in accordance with appropriate Industrial Court Awards) as follows:—

(*a*) District Councils' salary £490 13s. 4d.–£22 (4)–£578 13s. 4d. a year.

(*b*) County Council salary £735–£35 (3)–£840–£38 10s. (5)–£1032 10s. a year.

Whitley Medical Council conditions apply and also relevant Standing Orders of the employing Councils. Commencing salaries will be fixed according to qualifications and experience. Medical examination. Posts superannuable.

Application forms obtainable from the Clerk of the County Council, County Hall, Chelmsford, returnable by 8th December, 1958. Canvassing disqualifies.

CROYDON. COUNTY BOROUGH OF CROYDON. ASSISTANT MEDICAL OFFICER OF HEALTH AND SCHOOL MEDICAL OFFICER. Applications are invited for this established appointment from registered medical practitioners having at least 3 years' experience after qualification, for duties mainly in the School Health and Maternity and Child Welfare Services. The D.P.H. or D.C.H. will be an advantage. Salary within the scale £1050–£50–£1200–£55–£1475 p.a.

Application forms, from the Medical Officer of Health, 45, Wellesley-road, Croydon, must be returned to him by 15th December, 1958. E. TABERNER, Town Clerk.

DURHAM COUNTY COUNCIL. Applications for the post of DEPUTY COUNTY MEDICAL OFFICER OF HEALTH are invited from registered medical practitioners possessing a Diploma in Public Health or its equivalent, with administrative ability and previous experience of public-health administration. The salary is £2050 p.a., rising by annual increments of £105 to a maximum of £2365. A car allowance will be paid. The appointment is superannuable and will be subject to a medical examination. Canvassing directly or indirectly will disqualify and applicants must disclose in writing whether they are related to any member or senior officer of the Council.

Applications, endorsed "Deputy County Medical Officer", and the names of 3 persons to whom reference can be made, must reach the undersigned not later than 19th January, 1959.

J. K. HOPE, Clerk of the County Council.

Shire Hall, Durham.

NORTHAMPTONSHIRE. Applications are invited from registered medical practitioners holding a D.P.H. for appointment of DEPUTY COUNTY MEDICAL OFFICER OF HEALTH AND DEPUTY SCHOOL MEDICAL OFFICER. Candidates must have had experience in the administration of the Public Health Service, preferably in a County Health Department, and in particular experience in the administration or the Mental Health Service is desirable. The salary will be on the scale £1700–£1965 p.a. Travelling and subsistence allowances on the scale from time to time approved by the County Council will be paid. The appointment will be superannuable, and the successful candidate may be required to pass a medical examination. The Officer will be required to devote his whole time to the duties of the office and to reside in or near Northampton. The appointment will be determinable by 3 months' notice on either side.

Applications, stating age, qualifications and experience, with the names of 2 referees, should reach the undersigned by 17th December, 1958.

J. ALAN TURNER, Clerk of the County Council.

County Hall, Northampton.

NOTTINGHAMSHIRE COUNTY COUNCIL. Appointment of Medical Officer. Applications invited from registered medical practitioners (either sex) for the whole-time appointment of SENIOR CLINICAL MEDICAL OFFICER. Salary within the scale £1250–£50–£1400–£55–£1510–£65–£1575, subject to a maximum commencing salary of £1400 p.a.

Applicants should:—

(*a*) Possess the D.P.H., D.C.H., or comparable qualification.

(*b*) Have had at least 3 years' experience as whole-time Clinical Medical Officer in the Antenatal, Child Welfare and School Health Services of a Local Authority since July, 1948.

(*c*) Have been approved by Ministry of Education for, and have had substantial experience in, the ascertainment of educationally subnormal children.

Application forms and conditions of appointment from the County Medical Officer, Shire Hall, Nottingham. Applications by 31st December, 1958.

A. R. DAVIS, Clerk of the County Council.

NEW ZEALAND HEALTH DEPARTMENT.

Vacancy, MEDICAL OFFICER, Queen Elizabeth Hospital, Rotorua.

Salary: Up to £1170 p.a., according to qualifications and experience. Residential accommodation for single or married persons is available at present, but an additional £200 a year is payable if the appointee is required to live out.

The Queen Elizabeth Hospital (120 Beds) is mainly concerned with the treatment of acute and chronic rheumatic diseases, and active clinical research and teaching is carried out there. Applicants should have a good general knowledge of medicine, and preference will be given to those holding or those intending to acquire higher qualifications. Generous allowances towards the cost of passages to New Zealand for the successful applicant and his wife and family, if any, will be granted.

Inquiries, mentioning this publication, should be addressed to the High Commissioner for New Zealand, 415, Strand, London, W.C.2, who will furnish further details and application forms. Completed applications to be lodged in London not later than 20th December, 1958.

SOMERSET COUNTY COUNCIL. Senior Medical Officer for Maternal and Child Health Services. Applications are invited from registered medical practitioners (Women) for this whole-time superannuable post. Candidates should hold the D.P.H. or D.C.H. and have wide experience in maternal, child health, and general public-health work. Car allowance. Salary scale £1520–£50–£1570–£55–£1955 p.a.

Details and application forms obtainable from Dr. J. F. DAVIDSON, County Medical Officer of Health, County Hall, Taunton. Closing date 19th December, 1958.

WEST BROMWICH. COUNTY BOROUGH OF WEST BROMWICH. HEALTH DEPARTMENT. Applications are invited from registered medical practitioners for the temporary post of ASSISTANT MEDICAL OFFICER OF HEALTH AND SCHOOL MEDICAL OFFICER for a period of approximately 6 months. Possession of the D.P.H. or previous experience in public health, though desirable, is not necessary. Salary dependent on experience and qualifications, the minimum being £1050 p.a.

Applications, with full particulars and names of 2 referees, to the Town Clerk, Town Hall, West Bromwich, by 6th December, 1958.

GOVERNMENT OF TANGANYIKA. Medical Officer (psychiatry) with degree registrable in United Kingdom and some psychiatric experience required at once for duties at Government mental hospitals. D.P.M. desirable but not essential. Appointment on permanent basis with pension (non-contributory), or on contract with gratuity (taxable) of 13½% of salary drawn (less allowances) on satisfactory completion of service. National Health Service doctors may retain superannuation rights and receive gratuity (taxable) of 20% of aggregate salary on termination of engagement. Salary scale £1284–£2115 a year, starting-point determined by experience and qualifications. Limited private practice permitted at present. Education allowance of £100 a year for each child being educated at approved secondary school outside Tanganyika. Quarters generally available at low rental. Taxes at local rates. Annual local leave permissible and generous home leave after each tour of 30–36 months. Passages for officer, wife, and up to cost of 1 adult fare for children (under 18) at commencement and termination of each tour.

Application forms from Director of Recruitment, Colonial Office, London, S.W.1 (quoting BCD.117/8/034).

GOVERNMENT OF THE EASTERN REGION OF NIGERIA. SPECIALIST GYNÆCOLOGIST required to undertake clinical gynecology and obstetrics, including visits to hospital units in the Region and specialised advice to medical officers. Candidates must possess M.R.C.O.G. or equivalent, and have considerable experience.

Appointment may be :—

(*a*) On contract for 2 tours of not more than 2 years each. Salary £2442 a year with gratuity (taxable) on completion of satisfactory engagement at rate of £37 10s. for each completed period of 3 months' service (including leave).

(*b*) From National Health Service, candidate retaining superannuation rights and receiving gratuity (taxable) of 20% of aggregate salary. Salary £2220 a year.

Quarters provided at low rental. Taxes at local rates. Generous home leave after each tour. Children's (separate domicile) allowance of £75 a year for each of 2 children under 18 maintained outside Nigeria. Return passages for officer and wife at beginning and end of each tour, and passage assistance of up to £450 per tour to bring officer's children out to Nigeria, or to allow officer's wife to be with them for a time in United Kingdom.

Application forms from Director of Recruitment, Colonial Office, London, S.W.1 (quoting BCD.117/411/017).

GOVERNMENT OF THE EASTERN REGION OF NIGERIA. Applications invited from doctors with medical qualifications registrable in the United Kingdom for the following posts :—

MEDICAL OFFICERS for general medical duties in urban and rural areas. "R" practitioners, i.e., practitioners liable for call-up under the National Service Acts may apply and, if appointed, will be granted indefinite deferment of call-up on completion of 2 tours of service each of 18–24 months.

MEDICAL OFFICERS OF HEALTH for administration of environmental hygiene, maternal and child welfare, school health, health education, and control of communicable diseases. Women eligible, and would be encouraged to concentrate on school health and welfare duties. At present emphasis is being placed on development of a school health service and on tuberculosis control. Officers may be required to visit rural areas around the township where their principal responsibility lies. Candidates must possess D.P.H.

Appointments (*a*) on contract with gratuity (taxable) payable on completion of satisfactory engagement at rate of £37 10s. for each completed period of 3 months' service (including leave); or (*b*) from National Health Service, candidates retaining superannuation rights and receiving gratuity (taxable) of 20% of aggregate of salary.

Salaries per annum under :

(*a*) Medical Officers £1344–£2118.
Medical Officers of Health £1530–£2118.
(*b*) Medical Officers £1212–£1950.
Medical Officers of Health £1410–£1950.

Medical Officers of Health receive in addition £100 a year staff pay. Starting-points in salary scales determined by age and experience.

Quarters provided at rental of 8½% of salary. Taxes at local rates. Local leave permissible; generous home leave after each tour. Free return passages for officer and wife; passage assistance of up to £450 per tour to bring officer's children to Nigeria or to allow officer's wife to be with them in United Kingdom. An additional allowance of £75 a year for each of up to 2 children domiciled in United Kingdom while parents are in Nigeria.

Application forms from Director of Recruitment, Colonial Office, London, S.W.1 (quoting BCD.117/411/05).

GOVERNMENT OF THE FEDERATION OF RHODESIA AND NYASALAND. MINISTRY OF HEALTH. As a result of continual expansion, further vacancies exist for GOVERNMENT MEDICAL OFFICERS. These are essentially general duty posts and applicants must have completed 1 year's experience since qualifying. Minimum commencing emoluments, including allowances in lieu of private practice, vary between £1550 and £1750 p.a., according to experience. The maximum gross emoluments on this grade are £2250, but opportunities exist for transfer to centres with private practice benefits or promotion to higher grades.

Application forms and further details may be obtained from the Secretary (R), Rhodesia House, 429, Strand, London, W.C.2. Closing date 20th December.

Miscellaneous

Smith and Nephew Research Limited invite applications for the position of Senior Pharmacologist (Male) in their Chemotherapy Division. Applicants should possess an honours degree, preferably in pharmacology, or in physiology, and should have had some years' postgraduate research experience in pharmacology, either at a University or in industry. It is essential that applicants should be familiar with a wide range of pharmacological techniques, and with the use of statistical methods in the planning and analysis of biological tests. Experience in histopathology would be an advantage. The preferred age for the applicant would be between 30 and 35 years, but applications are also invited from candidates with special qualifications outside these age-limits. The person appointed will be responsible for the work of a small group of pharmacologists engaged on the examination of compounds of potential therapeutic value, and will be required to cooperate closely with other members of the scientific staff. The salary will be in accordance with age, qualifications and experience, and a contributory pension fund is operated by the Company.

Applications should be sent to the Technical Secretary, SMITH AND NEPHEW RESEARCH LIMITED, Hunsdon Laboratories, near Ware, Herts.

Alfred Holt & Company (The Blue Funnel Line) have a vacancy for a Full-time Assistant Medical Superintendent. Applications are invited for this pensionable post, which combines clinical and administrative duties principally in the Liverpool area. Salary will be initially in the range recommended by the B.M.A. for Assistant Medical Officers. Candidates should be between 38 and 46 and should have good general experience; some knowledge of radiology is an advantage. The successful applicant will be required to serve as Ship's Surgeon for some months in the course of his training, which is designed to fit him for early promotion to Medical Superintendent. The present Medical Staff comprises 25 Ship's Surgeons and over 40 registered Male Nurses. The fleet, of about 70 cargo liners, trades principally between Europe and the Far East, Indonesia and Australia.

20-man medical group in Central United States desires association of a well-trained Ophthalmologist. Inquiry invited.—Reply to ARNOLD S. JACKSON, M.D., Jackson Clinic, Madison, Wisconsin, U.S.A.

Consulting-room, furnished, with Waiting-room, telephone, service, receptionist, 1st floor.—50, Great Cumberland-place, W.1 (Marble Arch). Telephone: PAD. 7800.

Unfurnished. 2 self-contained Flats off Welbeck-street, W.1. 2 minutes Harley-street. Second and third floor, lift. Modern block, central heating, h. & c. water, tel. Parquet floor, 4 large rooms, kitchen, bathroom, &c. Ideal consultant; retired. Can use for both purposes. Long lease.—Address, No. 445, THE LANCET Office, 7, Adam-street, Adelphi, London, W.C.2.

"Pregnancy Diagnosis by the Xenopus Method," 24-hour service. Send specimens of urine and £2 2s. fee. Hæmatology, Biochemistry, Flame Photometry.—WELBECK BIOLOGICAL LABORATORIES, 26, Park-crescent, Portland-place, W.1 (MUSeum 5386–7).

Doctors requiring applications, theses copied: Write to MANTON (WESTMINSTER) LTD., 153, Victoria-street, S.W.1 (VIC. 0141), who are specialists.

For Sale. Cambridge Portable Cardiograph (1951) and spare fibre. Good condition. £75 or nearest offer.—Senior Photographer, Royal Marsden Hospital, Fulham-road, London, S.W.3.

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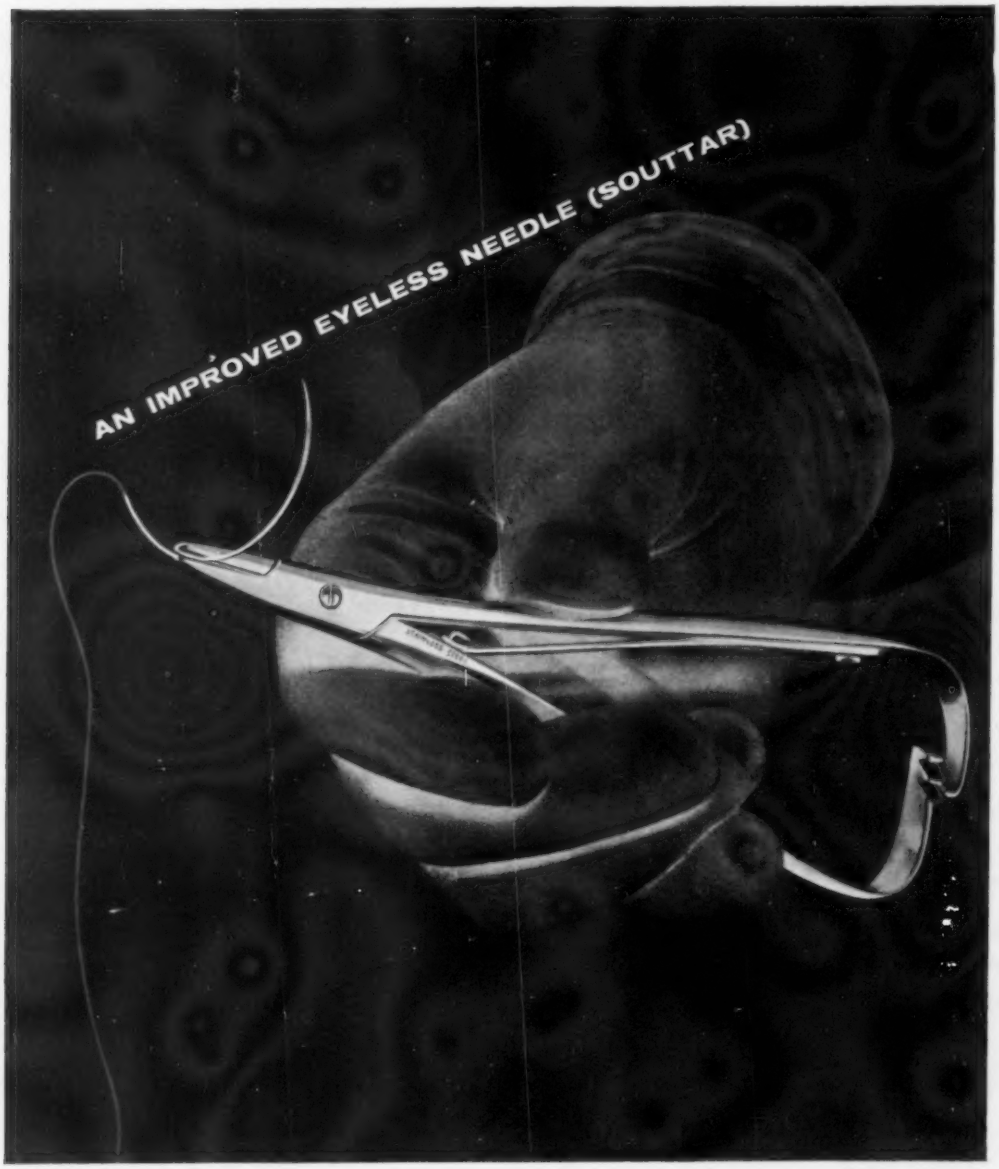

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